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DISEASES CAUSED BY BACTERIA AND FUNGI.

BLOOD, J. W., & ROWLANDS, A. (1936). **The Chlorine Content of Milk as an Indication of Mastitis.**—*J. Dairy Res.* **7.** 47-54. 3 tables. [17 refs.]

Comparison of five different methods of determining the chlorine content of milk showed four of them to give reasonably concordant results. When applied to a herd in which contagious mastitis was rampant, these methods showed that a high percentage of infected quarters, as determined by bacteriological examination, gave secretion with a chlorine content within the range of normal milk, *i.e.*, 0·07 to 0·12 per cent., whilst, on the other hand, milk from non-infected quarters in some cases gave a chlorine content well above these limits. It is concluded that determination of the chlorine figure of milk is not a reliable method for the detection of mastitis.—N. J. SCORGIE.

MILLER, W. T. (1936). **Bovine Mastitis.**—*N. Amer. Vet.* **17.** No. 3. 32-41. [18 refs.]

A general consideration of the work done on mastitis, in which the author gives the results of some of his own experiments. Examination of samples of colostrum from 96 first-calf heifers showed only one animal to be carrying *Streptococcus agalactiae.* Evidence is given to show that palpation of the udder is the most practical means of detecting chronic mastitis in the field. Attempts to transmit infection by means of milking machines from infected to healthy animals were not successful. Intravenous injection of cultures was likewise unsuccessful in implanting *Str. agalactiae* in the udder.—N. J. SCORGIE.

TOMAN, R. V. (1935). Over de taak van den dierenarts op het gebied van melkhygiene. De bestrijding van uierstreptomycose en -pyobacillose door inspuitingen van autovaccin in de periode van droogstaan. [**Treatment of Bovine Mastitis by Autogenous Vaccination during the Dry Period**].—*Tijdschr. Diergeneesk.* **62.** 909-913. [German summary: abst. from orig.]

This is mainly a description of the pathology and control of bovine mastitis. With regard to vaccination during the dry period, subcutaneous prophylactic and curative injections of "Yatren vaccine E 104" are said to have been of value. The author also employed an autogenous vaccine prepared by the Rijksserum-inrichting. Good results were also said to be obtained with "entozon" infusions.

—M. J. J. HOUTHUIS (ROTTERDAM).

COX, G. A., & WHITEHEAD, H. R. (1936). **Streptococci which produce a Substance inhibiting the Growth of Lactic Streptococci. Occurrence and Distribution.** —*N.Z. J. Agric.* **52.** 438-444. [3 refs.]

The article deals with tests used for recognizing inhibitory streptococci and their habitat. Such streptococci are not necessarily associated with mastitis but, although frequently obtained from the udders of cows, they can also be found in silage, cow dung, and on the coats of animals.—C. S. M. HOPKIRK.

LANG, S. J., & BOYS, F. (1934). **Importance of Continuous Agitation in Bactericidal Tests with Streptococci.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 18-20. 1 fig., 2 tables. [4 refs.]

Lang and Boys stress the importance of continuous agitation in carrying out bactericidal tests, and give tables showing that, with the strain of *Streptococcus viridans* used in the paper immediately preceding, [BOYS, F., GUNN, F. D., & LANG, S. J. (1934). *Proc. Soc. exp. Biol., N.Y.* **32.** 13.], reduction of the number of implanted organisms occurred in only two out of 19 cases in which the tubes were left stationary whereas, when continuous agitation was used, reduction was usual and in all cases a much greater killing effect was observed. The apparatus described is simple, consisting essentially of three brass plates rigidly attached to a worm-driven shaft, one of which is solid and acts as a base whilst the others, which support the tubes near their ends, are perforated at uniform distances near the circumference. The tubes are fixed at an angle to the axis by placing one end of the tube in the second or third perforation from that opposite the one containing the other end. As the rack is slowly rotated, the angle of the tube to the horizontal changes and reverses, with the result that the contained fluid runs from end to end. [For another type of mixing machine, see TODD (1927). *Brit. J. exp. Path.* **8.** 1].—A. W. STABLEFORTH.

LESBOUYRIES, G., BERTHELON, & PAYARD. (1935). Notions étiologiques sur la vaginite granuleuse des brebis. **[Granular Vaginitis of Ewes].**—*Bull. Acad. vét. Fr.* **8.** 478-481.

The causal agent is a Gram-positive streptococcus which can be isolated on serum agar from the vagina of affected ewes. It does not liquefy gelatin and produces acid but no clot in litmus milk in four days. It is of the *viridans* type. Lactose, maltose, saccharose and glucose are fermented without gas production, but the organism produces no change in arabinose, rhamnose, laevulose, galactose, glycerin, dulcite and inulin.

The authors have failed to set up any reaction in rabbits by intravenous injection or in mice by the subcutaneous method.

In one healthy ewe cohabitation with an infected ewe did not set up infection. The insertion into the vagina of a healthy ewe of a cotton wool tampon, previously introduced into the vagina of an affected ewe, also failed to infect. Infected vaginal washings did, however, set up the disease in four days, and two ewes became diseased following the vaginal injection of broth cultures of the isolated streptococcus.

Although a culture of a streptococcus from a case of pleuro-pneumonia gave rise in a similar manner to a granular vaginitis, there were marked cultural and biological differences between this organism and the streptococcus isolated from natural cases of infection.—GWILYM O. DAVIES.

MINETT, F. C. (1936). **Staphylococci from Animals with particular reference to Toxin Production.**—*J. Path. Bact.* **42.** 247-263. 7 tables. [10 refs.]

Strains of haemolytic staphylococci from the following sources were examined:– human beings, 4 (including "Wood 46"); cows, 27; calves, 5; horses, 7; sheep, 2; rabbits, 1; foxes, 1 and dogs, 8. Ten of the cow strains were from cases of mastitis, the remainder being from normal or slightly altered milk. Most of the other strains were from suppurative processes. Prominent features were :– liquefaction of gelatin, acid clot in milk, acid formation from mannite but not from salicin, and pigmentation pale *aureus*. A few exceptions were noted, one being that dog strains liquefied solid horse serum.

Toxin production was specially studied. The production of β toxin [see this *Bull.* **6.** 484.] is characteristic; of 97 strains, mostly from cows' milk, only five failed to form recognizable amounts of β toxin. Ten strains, including eight from dogs, produced β toxin and very small or undetectable amounts of α toxin. Of 444 random samples of cow serum, 339 had less than 7 international units per c.c.; in 76 of 85 random samples, the β unitage was 0·45 or less.

MARTINS, A. (1934). Carbunculo hematico. Palestra realisada na Secção de Pathologia Animal em 2 Outubro de 1934. [**Anthrax (Review)**].—*Rev. Dep. nac. Prod. anim.* **1.** Nos. 5-6. 209-219.

This is a selective review of literature dealing with the less-known aspects of the bacteriology and immunity of anthrax.—R. S. ROBERTS.

KRITSCHEWSKI, J. L., & HERONIMUS, E. S. (1935). Zur Kritik der phagozytären Doktrin. X. Die Schutzapparate des Organismus gegenüber der Milzbrandinfektion. [**The Mechanism of Immunity to Anthrax**].—*G. Batt. Immun.* **14.** 33-49. 4 plates, 8 tables. [7 refs.] [In German: abst. from abst. in *Bull. Inst. Pasteur.* **33.** 836].

The authors inoculated rats intravenously with a 24-hour culture of *Bacillus anthracis*; the bacilli were observed to disappear in the body within three minutes, without being phagocytosed by the leucocytes. They conclude that natural bacteriolysins are present in the blood of the rat, which accounts for their immunity to anthrax.

STAMATIN, N. (1935). Le rôle des colonies secondaires dans le changement rapide des caractères culturaux et de la virulence chez une souche asporogène de Bacillus anthracis. [**The Role of the Secondary Colonies in the Change in Cultural Characters and Virulence of a Non-Sporulating Strain of** *B. anthracis*].—*Arhiva vet.* **27.** 3-19. 5 figs., 3 tables. [13 refs.] [In French].

Coccoid forms, found in a culture of a non-sporulating strain of *B. anthracis*, gave rise to secondary colonies, which appeared about the tenth day. These colonies were of two kinds, opaque and transparent. The organisms in the former did not form an even suspension when shaken up in broth, and were more virulent than the parent strain. Those forming the transparent colonies were less virulent than normal, but formed a homogeneous suspension in broth.—A. W. TAYLOR.

—. (1935). Forholdet mellem den bovine og humane tuberkulose belyst fra dyrlaegelig og laegelig side. [**Relation between Bovine and Human Tuberculosis**].—[Joint Discussion at the Annual Meeting of the Danish Medical Association and the Danish Veterinary Medical Association held at Odense, May 30th, 1935]. [Proceedings published in a supplement to *Medlemsbl. danske Dyrlaegeforen.* **18.** Nos. 15-18 and in *Hospitalstidende.* **78.** No. 30].

I. BANG, O. (1935). Om forholdet mellem den bovine og humane tuberkulose. [**Relation between Bovine and Human Tuberculosis**].—*Suppl. as above.* pp. 2-9.

II. GRINSTED, P. (1935). Almindeligt ivaerksatte foranstaltninger til imødegaaelse af tuberkulosesmitte af bovin oprindelse gennem nydelse af maelk og disses tilstraekkelighed. [**Efficiency of the Common Methods of Preventing Tuberculosis originating from Milk**].—*Ibid.* pp. 10-17.

III. JENSEN, K. A., & FRIMODT-MØLLER, J. (1935). Bakteriologiske undersøgelser over den humane og bovine tuberkelbaciltype. [**Research on Human and Bovine Types of Tubercle Bacilli**].—*Ibid.* pp. 18-37. 5 tables.

IV. CHIEVITZ, O. (1935). Er der forskel paa det kliniske billede af den humane og bovine infektion saerlig ved kirurgisk og glandeltuberkulose ? [**Differentiation of the Human and Bovine Types of Infection especially in Surgical and Gland Tuberculosis**].—*Ibid.* pp. 37-44. 3 figs.

V. BLEGVAD, O. (1935). Fortsatte undersøgelser over conjunctivaltuberculosen. [**Investigations on Conjunctival Tuberculosis in Man**].—*Ibid.* pp. 45-51. 8 figs.

I. The author gives a historical review of the progress of knowledge on the interrelationship of the human and bovine types of tubercle bacilli, suggesting that some of the earlier work led to erroneous conclusions, due to the existing knowledge on the subject. Inoculation of rabbits, by the workers of the last century, with human material probably included a proportion of infections with the bovine type of bacillus which were not then recognized. In earlier times the proportion of the bovine type of infection in human beings was probably commoner than nowadays.

The principles of tuberculosis control in cattle are enumerated. In Denmark, as well as in the other Scandinavian countries, the aim is to attain the complete eradication of the disease. Bang's method of control is used. During recent years interest has been taken in the so-called filtrable stages of tubercle bacilli, and the transmission of such forms from mother to foetus has been discussed. Experience shows that as far as cattle are concerned this phenomenon is without importance. If it did hold good the existing scheme for the building up of clean herds would be impossible.

II. The supervision of milk in Denmark for the purpose of preventing tuberculous infection in man is described, emphasis being laid on the necessity for uninfected milk for children. Milk and cream used for butter production must be pasteurized ; in consequence the skimmed milk given to livestock is also pasteurized. Cows affected with tuberculosis of the udder or the uterus have to be slaughtered.

For the supervision of pasteurization by the rapid method, Storch's test is used, but there is no such simple test for slow pasteurization, the supervision of which is, therefore, more troublesome. An increasing number of towns now demand that milk sold raw must come from tuberculosis-free herds.

III. The authors carried out typing tests on Löwenstein's medium with material from more than 3,000 cases of tuberculosis in human beings. They speak highly of the value of this medium for the purpose. In table IV provisional statistics are given according to which about 10 per cent. of pulmonary tuberculosis, 33 per cent. of tuberculosis in bones, joints and urinary organs, 85 per cent. of tuberculosis in the lymph nodes of the neck and 33 per cent. of tuberculous meningitis in children below 15 years is caused by the bovine type. In general, the percentage of infections due to this type of bacillus is lower among older indi-

viduals. These infections in young as in older persons are most prevalent in regions where tuberculosis in cattle is comparatively frequent.

A number of cultures in this extensive material differed from the normal, either as regards cultivation or as regards virulence. Only a very few differed in both respects. Some of the strains corresponded to the dysgonic human strains described by GRIFFITH. A number of strains with the cultural characters of the bovine or human types, but displaying impairment of virulence, originated with a single exception from tuberculosis of the skin. These strains also showed complete correspondence with similar strains described by GRIFFITH. The authors endorsed the latter's view that the existence of neither the dysgonic human, the ordinary human nor the bovine types of tubercle bacilli with impaired virulence can be taken as a proof that transition from one type to the other may take place. They must be regarded as varieties of one or the other of the types.

The authors found 11 strains in all that were really atypical. Three of them were mixed cultures of typical human and bovine types.

The eight remaining strains displayed such complicated bacteriological behaviour that experiments of long duration were required in order to find their proper place in the system of types, and the investigations are not yet complete. These " labile " strains had at first the properties of the human type, but having been passed through rabbits one or more times they were dissociated so that cultures appeared with colonies of bovine type as indicated by animal inoculation.

These strains are rare and the transformation of the bovine into the human type is an infrequent phenomenon. The figures arrived at in the case of bovine infection when determining the types are, however, consequently minimum figures, and an extra allowance must be made to cover this contingency when calculating the incidence of infection due to the bovine type.

It appears from the investigations that the bovine infection in man occurs far more frequently than has been suspected previously, and with our present knowledge we should no longer speak with sharp distinction of human *contra* bovine type of infection in human beings.

IV. The age incidence of the various forms of tuberculosis in man and the types of bacilli involved are described. As to frequency, the tuberculous disorders of bones and joints in man have a marked maximum at the age of three years. The same holds good of tuberculous meningitis. Twenty-six cases of pulmonary tuberculosis due to the bovine type were demonstrated in Copenhagen and the majority of cases showed evidence of infection *via* the respiratory tract. In man, both pulmonary tuberculosis, and also the other forms of tuberculosis due to infection with the bovine type of bacillus, do not behave in any manner that is essentially different from corresponding cases due to the human type as far as the clinical picture and the course are concerned.

V. According to the investigations of the author, primary conjunctival tuberculosis in man seems to be an infection with the bovine type of bacillus. The disease usually attacks persons under 20 years : the majority of 40 patients examined were women. Most were domestic servants or farm hands and had milked or attended to cows infected with tuberculosis. In all the 11 cases in which the type of tubercle bacillus was determined, it proved to be of the bovine type. Infection is carried by the person wiping the face with the hand, or perhaps by the whipping of a cow's tail. It is almost always the left eye that is attacked.

—H. C. BENDIXEN (COPENHAGEN).

RABAGLIATI, D. S. (1936). **The Incidence of Tuberculosis in Cattle in Rearing Districts.**—*Vet. Rec.* **16.** 107-108. 2 tables.

In routine veterinary examination it was found that in a rural district in the north-west of the West Riding of Yorkshire, containing 270 farms, with an average during the past six years of 2,271 adult cattle, the number of animals dealt with under the Tuberculosis Order was two per annum (0·08 per cent.). In this district an experimental tuberculin test was carried out on 171 cattle on seven farms in an isolated dale. There are practically no old cows kept in the district as cows are usually sold when they calve the second or third time. The results are shown in the following table :–

	Tested.	Reacted.	Per cent. Reactors.
Cows in Milk and Dry Cows ...	62	10	16·1
Heifers	30	2	6·6
Calves	74	1	1·3
Bulls	5	—	—

BRENNAN DEVINE.

PENDERGAST, W. M. (1936). **Skin Lesions in Cattle.**—*J. Amer. vet. med. Ass.* **88.** 74-75.

The author states that, as the result of a survey of a very large number of tuberculin-reacting cattle bearing skin lesions, he has failed, on *post-mortem* examination, to find internal lesions of tuberculosis in 95 per cent. It is suggested that the intradermal reactions in these instances are not altogether typical, and the opinion is expressed that care should be exercised in condemning such animals if they show suspicious reactions.—R. E. GLOVER.

—. (1935). Règlement d'administration publique pour l'application de la loi du 7 juillet 1933 sur la prophylaxie de la tuberculose des bovidés et sur le contrôle de la salubrité des viandes. [**Rules under the French Law of 7th July, 1933, for the Prophylaxis of Bovine Tuberculosis and the Control of Meat Inspection**].—*Rev. gén. Méd. vét.* **44.** 687-695. [Also appeared in *Rev. vét., Toulouse.* **87.** 700-709].

PROPHYLAXIS OF BOVINE TUBERCULOSIS.—This is carried out by the veterinary sanitary services at the request of and with the assistance of owners. The routine control measures are not undertaken until after slaughter of all animals in a herd in an infective condition.

The remainder are subjected to the tuberculin or other appropriate test and reactors are segregated. Certificates, valid for not more than a year, are granted in respect of clean herds, but become void on the reappearance of tuberculosis in the herd, which must be immediately notified. Detailed rules are given as to compensation. All preparations containing tubercle bacilli or their derivatives are to be supplied only under licence of the Minister of Agriculture and to qualified veterinarians.

MEAT INSPECTION.—Every abattoir or slaughter-house where animals are killed for human food is to be inspected by veterinary inspectors who may be assisted by approved sanitary officers. Rules for stamping inspected meat, for confiscation of unsound meat, and for the collection of taxes are set out in detail.

—F. BULLOCK.

ROBIN, V. (1935). Les ventes et échanges de bovins tuberculeux. [**The Law relating to the Sale of Tuberculous Cattle, France**].—*Réc. Méd. vét.* **111.** 937-955.

A commentary on the law of 7th July, 1933. A purchaser is now entitled to repudiate a contract if the animal purchased is found to be tuberculous, but no action is maintainable (a) if the price paid is less than Fr.100 ; (b) where the vendor can prove that the purchaser must have known that the disease existed ; (c) in the case of animals sold under distraint, and (d) where the parties have agreed that there is no warranty. No provision is made in the law that where expert evidence is necessary the expert must be a qualified veterinary surgeon. The various tuberculin tests are explained and the mode of carrying them out described. Many questions on doubtful points remain which can only be settled by action in the courts.—F. BULLOCK.

FRANCESCO, P. (1935). Osservazioni istologiche su organi di suini colpiti da tubercolosi di origine bovina. [**Histology of Bovine Type Tuberculosis in Swine**].—*Clin. vet., Milano.* **58.** 355-361. 5 figs. on 3 plates.

Histological studies were made from material which bacteriological examination had shown to be lesions caused by the bovine type of bacillus, although the organisms could not be found in the lesions. Typical tubercles were seen in the lung parenchyma. These were characterized by the presence of large epithelioid cells with round nuclei and accumulations of lymphoid cells in the peripheral zone, but no giant cells were present. Areas of infiltration were present between the tubules in the cortex of the kidney. The epithelioid cells, however, differed from those seen in the lung and possessed oval nuclei with a well-marked membrane. Extensive changes were seen in the parenchyma of the spleen, and typical lymphoid, plasma and giant cells were present. The liver lesions showed a subcapsular and perilobular distribution. Epithelioid cells, fibroblasts and a few giant cells were present. Numerous typical nodules were seen in the lymphatic glands ; caseation was also often observed.—J. A. NICHOLSON.

GIUDICE, R. (1935). Su di un caso di tubercolosi spontanea riscontrato nella pecora. [**A Case of Spontaneous Tuberculosis in a Sheep**].—*Profilassi.* **8.** 207-212. 2 figs. [Numerous refs.] [English, French and German summaries : abst. from orig.]

After briefly summarizing the recorded cases of spontaneous tuberculosis in sheep, the author describes lesions found in the lung of a 13-month-old lamb which had been slaughtered at the local abattoir. Unfortunately no other organs were available for examination. Yellowish nodules were present both on the surface and in the interior of the left lung. These varied in size between that of a hempseed and of a bean and were impossible to enucleate as they had infiltrated into the surrounding healthy tissue. They were provided with a connective tissue capsule and sections revealed the presence of numerous acid-fast bacilli. Some of the nodules showed signs of caseation and others were calcified. The bronchial lymphatic glands were enlarged and areas of induration were present on the pleura. Details are given.

Bacilli isolated in culture were of the bovine type.—J. A. NICHOLSON.

GRIFFITH, A. S., & MENTON, J. (1936). **Human Tuberculosis of Bovine Origin in Staffordshire.**—*Brit. med. J.* March 14th. 524-526. 2 tables. [2 refs.]

The authors determined the types of tubercle bacilli in 49 cases of non-pulmonary tuberculosis and in 230 out of 263 cases of pulmonary tuberculosis in the County of Stafford. All 6 cases of cervical gland tuberculosis, 5 of 12 cases of tuberculous meningitis, 10 of 29 cases of bone and joint tuberculosis and 2 of the 230 cases of pulmonary infection were due to bovine tubercle bacilli. The per-

centage frequency of the non-pulmonary forms due to the bovine strain was somewhat similar to that recorded for certain parts of Scotland, but the percentage of bovine pulmonary infections was considerably lower in Staffordshire.

Inquiries made into the milk supply of the bovine non-pulmonary infections revealed that in many instances there was a history of bulk milk samples from the farms concerned having proved positive.—GWILYM O. DAVIES.

GRIFFITH, A. S., & SMITH, J. (1935). **Bovine Phthisis. Its Incidence in North-East Scotland.**—*Lancet.* **229.** 1339-1342. 3 tables.

In this article, the authors record the investigations of MUNRO into the relatively frequent occurrence in Scotland of phthisis pulmonalis due to the bovine type of bacillus. During the period 1923 to 1930, 15 cases were found to be due to tubercle bacilli of the bovine type in 366 persons affected with phthisis resident in the middle east of Scotland. In 1931, investigations in the southern counties of Scotland showed bacilli of the bovine type to be responsible for about a similar relative frequency. A high percentage of infections of this type was also found in other forms of human tuberculosis. In 15 cases of tuberculous meningitis in Aberdeen, eight were found to be due to the human and seven to the bovine type of bacillus.

An inquiry began in April, 1934, with the investigation of 103 cases of pulmonary tuberculosis ; in the typing of the strains the cultures fell into the three following groups :- (1) dysgonic bovine ; (2) dysgonic human, and (3) eugonic human. Bacilli of the bovine type were cultivated from the sputum in 13 cases. All the strains obtained from these 13 cases were typically dysgonic bovine. The strains were tested in rabbits and found infective in each case.

Indications were that in five cases the channel of entry was the alimentary canal, but in the other eight cases there was no evidence to show the path of infection. It may have been from persons affected themselves with bacilli of the bovine type, or it may have been from affected cattle, the source possibly being infected suspended dust in the air. None of these eight persons had, however, been in contact with cattle.—BRENNAN DEVINE.

CHARGAFF, E., & SCHAEFER, W. (1935). **A Specific Polysaccharide from the Bacillus Calmette-Guérin (BCG).**—*J. biol. Chem.* **112.** 393-405. 2 tables. [21 refs.]

Two polysaccharides were obtained from defatted BCG by means of acetate buffer or by dilute acetic acid. One of these compounds, termed fraction A, was readily soluble in alkalies, while the other, termed fraction S, required rather strong acids to bring it into solution. Both were free from proteins and contained large amounts of reducing sugars after hydrolysis with acids – 77·2 per cent. in the case of A and 94 per cent. in the case of S. In addition, the S fraction was closely associated with calcium phosphate from which it was liberated with difficulty.

These polysaccharides were devoid of antigenic activity, but gave marked precipitates with antituberculous sera in final dilutions varying from 1 : 250,000 to 1 : 1,000,000.

The chemical and immunological properties of a protein fraction, obtained from the bacilli after extraction of the polysaccharides and showing a weak tuberculin activity, are also described.—R. E. GLOVER.

BAGINSKI, S. (1935). Recherches histologiques sur la perméabilité de la muqueuse digestive au BCG chez les animaux adultes. [**Permeability of Digestive**

Mucosa to BCG in Adult Animals].—*Bull. Histol. Tech. micr.* **12.** 329-343. 2 plates. [Numerous refs.] [Copied *verbatim* from *Physiol. Abstr.* **20.** 792. Signed E. E. HEWER].

The bacilli were introduced by open operation directly into the small intestine of adult rabbits and guinea-pigs. They were found to enter through the striated border of the cells and to pass into the central lacteal assisted by the movements of the villi.

CORPER, H. J., & VIDAL, C. B. (1935). **Tuberculous Bacillaemia. Experimental Studies with the Three Pathogenic Types of Tubercle Bacilli.**—*Amer. Rev. Tuberc.* **32.** 575-587. 5 tables. [15 refs.]

Tuberculosis in susceptible animals is not commonly a bacillaemia in the sense that the tubercle bacilli reside or multiply in the circulation.

Virulent suspensions of human, bovine or avian strains injected intravenously in doses of 0·001 mg. or less into guinea pigs, rabbits, chickens and dogs rapidly disappear from the circulation although lesions of generalized progressive tuberculosis result. When injected in larger doses, the bacilli can be found in the circulation until early acute death occurs, but there is no evidence that they multiply in the circulation.

Although a certain parallelism exists between susceptibility of an animal to a particular strain and the persistence of tubercle bacilli in the blood after inoculation, there is a marked difference in the organic susceptibility of the various animals.

—GWILYM O. DAVIES.

NÈGRE, L., BRETEY, J., & GERHARDT, O. (1935). Sur la valeur des résultats obtenus chez les cobayes inoculés avec un produit pathologique et traités par des injections d'extrait acétonique de bacilles de Koch. **[The Results Obtained by the Inoculation of Guinea Pigs with Tuberculous Material and Treating them with Acetone Extracts of Tubercle Bacilli].**—*C. R. Soc. Biol. Paris.* **118.** 649-651. [3 refs.]

Nègre and his co-workers [(1932). *Pr. méd.* Dec. 24th. p. 1946.] have shown that following the inoculation of guinea pigs with pathological material, the bi-weekly injection of the animals for a period of two months with 1 c.c. of an acetone extract of tubercle bacilli has assisted in the demonstration of tubercle bacilli, when inoculation alone has given negative results.

The authors have now demonstrated by this method the presence of the classical rough colonies of tubercle bacilli in the systems of normal guinea pigs. It has been possible to isolate by the same method smooth colonies of acid-fast bacilli, non-pathogenic for the guinea pig, rabbit and fowl, that sensitize guinea pigs to tuberculin.

In animals inoculated with pathological material and treated by this method positive results have been obtained in 24 per cent. of cases – in each instance rough and smooth cultures being obtained.—T. M. DOYLE.

SCHAEFER, W. (1935). Sur un type particulier de bacilles acido-résistants isolés de l'organisme du cobaye. Identification sérologique. **[The Serological Identification of Certain Acid-Fast Bacilli Isolated from Guinea Pigs].**—*C. R. Soc. Biol. Paris.* **119.** 961-963. 1 table. [2 refs.]

An examination of six cultures of acid-fast bacteria obtained from guinea pigs under varying conditions has shown that, although they resemble the avian type, they differ from it on serological grounds. By applying the complement-fixation adsorption method [see this *Bull.* **6.** 5.] it can be shown that, while they possess

components common to both the bovine and the avian types, these can be eliminated by treatment with bovine and avian strains, leaving a third component which seems to be specific to each member of this group.—R. E. GLOVER.

TAKEDA, Y., ANDO, K., HATA, C., & MIWA, B. (1935). Chemische und Biologische Untersuchungen der säurefeste Bakterien. II. Mitteilung. Untersuchungen der therapeutischen Hemmungswirkung der Tuberkelentwicklung sowie betreffenden Hemmungstoffe der erhitzt abgetöteten Tuberkelbacillen. [**Chemical and Biological Investigations of Acid-Fast Bacteria. II**].—*Jap. J. exp. Med.* **13.** 641-660. 2 plates, 11 tables. [11 refs.] [In German].

Injections of tuberculin had no useful therapeutic action when administered to guinea pigs 24 hours after they had been given an infective dose of human tubercle bacilli. All guinea pigs so treated became tuberculous, but they developed less extensive lesions than did control animals which received no tuberculin. A long series of injections of tuberculin prior to experimental infection had no prophylactic action whatever. Combined injections of living organisms and bacterial extract were ineffective, though massive doses of extract slightly retarded the production of lesions. Extracts prepared by extraction with water, alkali, chloroform, ether and alcohol were equally ineffective.—E. J. PULLINGER.

CLAWSON, B. J. (1936). **The Destruction of Tubercle Bacilli within Phagocytes in vitro.**—*J. infect. Dis.* **58.** 64-69. 4 tables. [13 refs.]

In one hour at 37°C. mononuclear leucocytes in the presence of immune sera phagocytozed and lysed tubercle bacilli (BCG), the degree of lysis being correlated to the concentration of agglutinins in the immune sera. Lysis did not take place in the presence of normal serum. The lytic action of washed leucocytes from immune and allergic animals was no greater than that obtained from those from normal animals.—N. J. SCORGIE.

AGNELLO, V. (1935). Influenza degli essudati pleurici sulla vitalità del baccillo di Koch. Ricerche sperimentali. [**The Effect of Pleural Exudate on the Vitality of** *Mycobact. tuberculosis*].—*Lotta. c. Tuberc.* **6.** 817-830. 2 tables. [20 refs.] [English, French and German summaries] [Copied *verbatim* from *Bull. Hyg., Lond.* **11.** 243. Signed H. H. S.]

Some authors have maintained that a pleural effusion is inimical to the growth of the *Myco. tuberculosis*, either inhibiting growth or actually killing the organism. Dr. Agnello has carried out experimental work in 10 cases of effusion. In those in which the organism was found there was no further growth or development, nor did they grow when added to the fluid. If, however, certain substances were added, such as Kirchner's medium in a proportion of about 2 to 1 of exudate, or Kirchner's *plus* serum, a good growth occurred. He maintains, therefore, the effect of the exudate itself is not actively inhibitory or bactericidal, but that it is by itself not a medium suitable for cultivation of the organism. Protocols show the results of the attempts at growth in the different exudates with and without addition of the other substances mentioned.

GIBBS, C. S. (1935). **The Etiology of Epidemic Colds in Chickens.**—*Science.* **81.** 345-346. [12 refs.]

There would appear to be variation in the symptoms of these conditions, but several workers have shown that a haemolytic Gram-negative bacillus is responsible,

named *Haemophilus gallinarum* by ELIOT and LEWIS. These authors also undertook filtration experiments with negative results.

Tracheal exudate from two outbreaks, where the above organism could not be demonstrated, was passed through graded acetic-collodion filters, and an agent between 80 and 100 $m\mu$ in size obtained, which set up the disease on intratracheal inoculation into healthy chicks.—A. W. TAYLOR.

LAMBERT, W. V. (1933). **A Preliminary Study of the Reaction of Two Disease Resistant Stocks of Chickens after Infection with their Reciprocal Pathogens.** —*Proc. Iowa Acad. Sci.* **40.** 231-234. 1 fig., 1 table. [5 refs.] [Copied *verbatim* from *Exp. Sta. Rec.* **74.** 105].

The results of work with *Salmonella pullorum* and *S. gallinarum* indicate that selection for resistance to one pathogen affords some protection to infection with a closely related one.

VAN ROEKEL, H. (1935). **A Study of Variation of Salmonella pullorum.**—*Bull. Mass. agric. Exp. Sta.* No. 319. pp. 60. 75 figs. on 16 plates, 20 tables. [Numerous refs.]

Dissociation related to stability of suspensions, agglutinability, salt sensitiveness, antigenic potency and virulence was observed in many strains of *S. pullorum* obtained by rapid subcultivation and stored in meat infusion broth. It was also found in 13 out of 163 freshly isolated strains. All the variants were normal as regards staining and biochemical reactions and all but two showed typical colony formation. It was found that liver infusion agar may produce characteristics not demonstrable with ordinary media. The terms S and R were inappropriate, as strains very far removed from normal as regards antigenic structure showed a smooth-surfaced colony, and no correlation between the form of the colonies and antigenic structure could be made. Most of the variants obtained were less virulent than normal ; some even appeared avirulent, while their antigenic power was also weaker than normal. Passage through chicks, adult fowls and eggs had little or no effect on the variant strains.

Maintenance of strains of *S. pullorum* in eggs, instead of in the usual media, is suggested as a means of retaining their original characteristics.—A. W. TAYLOR.

HOHN, J., & HERRMANN, W. (1936). Salmonella Essen 173, ein neuer Typ der infektiösen Darmerreger. [*Salmonella essen* **173**].—*Zlb. Bakt. I.* (*Orig.*). **135.** 505-509. [14 refs.]

A member of the genus *Salmonella* was isolated from human patients suffering from infectious enteritis. On antigenic analysis the " O " factors were IV and XII and the " H " factors were g, o, m. Since this antigenic combination has not previously been described, it is thought that the organism must be a new species. The name *S. essen* 173 is proposed.—E. J. PULLINGER.

JANSEN, J. (1935). Ueber die *Salmonella enteritidis* aus der Hausente. [*S. enteritidis* **of Domestic Ducks**].—*Zlb. Bakt. I.* (*Orig.*). **135.** 414-421. 3 tables. [7 refs.]

A study of the antigenic structure of strains of salmonella isolated from ducks in Germany and the Netherlands revealed that they all contained the " O " factor IX and the " H " factors g, o, m, thus resembling *S. enteritidis*. On account of the slow fermentation of dulcite by certain strains, the author advocates grouping them in a separate variety to be named *S. enteritidis* var. Muhleim.—E. J. P.

I. HAYES, F. M., & BARGER, E. H. (1935). **Bang's Disease in a Naturally Infected Herd.**—*Hilgardia.* **9.** 527-542. 3 figs., 1 table.

II. HENRY, B. S., HARING, C. M., & TRAUM, J. (1935). **Brucella abortus Shedder Conditions in Twenty Cows.**—*Ibid.* 545-566. 11 figs., 2 tables. [20 refs.]

I. In 1922, the percentage of reactors in the herd studied was 19·9 [the number of animals in the herd is not given]. 75·5 per cent. of these showed udder infection. Three out of 38 with udder infection showed no blood agglutinins for a varying period of time. When a composite milk sample from all four quarters is taken, a low titre reaction may be missed if agglutinins are present in only one quarter and in low titre. 25·5 per cent. of normally calving cows with positive blood titres were excreting *Br. abortus* at parturition [apparently means excretion in milk]. Cows in this infected herd, but with a consistently negative blood titre at 1 : 50 (0·54 per cent.) may occasionally discharge *Br. abortus* at parturition [? in milk]. A short account of orchitis due to *Br. abortus* is given. The disease was eradicated by removing blood reactors and searching for the organism in the milk of non-reactors.

II. Blood and milk titres are correlated with the excretion of organisms in the milk of 20 cows.

No milk negative at 1 : 50 contained the organism. In 96·3 per cent. of cases where the blood was positive in 1 : 200, the organism was present in the milk. As an index of infection, the milk agglutination test is not so reliable as the blood test. *Br. abortus* was not recovered from any udder where the milk titre in each quarter was less than 1 : 25. Spread of infection from quarter to quarter was very slow. Only the S type of *Br. abortus* was recovered from these cows.—D. L. H.

DAVID, H. (1936). Zur Erkennung und Bekämpfung der Bangkrankheit der Rinder. [**The Diagnosis and Control of Brucella Infection in Cattle**].—*Wien. tierärztl. Mschr.* **23.** 65-72 and 97-104. 2 tables. [9 refs.]

This is a lengthy examination of the methods available for diagnosis of *Br. abortus* infection in cattle, and readers are referred to the original. As regards the relative values of the whole blood or blood serum for a rapid agglutination test there was little to choose, both tests agreeing with the slow test in about 90 per cent. of cases. The rapid test tended to give false negative results when the titre was low. Comparison of the blood serum and milk whey agglutination tests yielded results in keeping with those reported by other workers.

The question of the fate of animals giving doubtful reactions to the agglutination test is discussed, as is the question of fluctuations of titre. The application of these findings to field control is considered. These latter sections are unsuitable for abstraction.—E. J. PULLINGER.

DELEZ, A. L. (1936). **A Study of the Channels of Brucella Infection in Bulls with Results of Conjunctival and Skin Exposures to Bovine and Porcine Strains.**—*J. Amer. vet. med. Ass.* **88.** 24-31. 1 table. [8 refs.]

The author describes experiments in which he endeavoured to infect bulls with bovine and porcine strains of *Br. abortus.* Twelve bulls were used, and the following routes of infection adopted :– intravenous, three ; conjunctival, four ; skin both abraded and not abraded, three ; skin and conjunctival, one, and *per os*, one. In no cases were brucella organisms recovered *post mortem* from the genitalia of the bulls. Weak agglutination reactions developed after exposure to infection except in those animals where the unabraded skin was the route selected. Although no brucella organisms were isolated, lesions in some instances were found in

the testicles and epididymides. More definite results followed the use of the bovine strains.—H. G. LAMONT.

BÜLOW. (1936). Sprunggelenksentzündung durch Brucella ab. Bang bei einer jungen Remonte. [**Arthritis of the Hock Joint in a Horse caused by** *Brucella abortus*].—*Z. Veterinärk.* **48.** 105-112. [Numerous refs.]

A case of arthritis of a purely local character, of an acute type, due to *Br. abortus.* —E. J. PULLINGER.

ROSSI, P. (1936). Urée sanguine et brucellose des équidés. [**Blood Urea and Equine Brucella Infection**].—*C. R. Soc. Biol. Paris.* **121.** 611-612.

Chemical examinations of the blood of 35 horses suffering from brucella infection demonstrated that no significant change from the normal had occurred in the amount of urea in the blood, either when the animals were suffering from a latent form or when clinical manifestations of the disease were present.—J. S.

CLARK, C. F. (1935). **English Sparrows as Possible Carriers of Brucellosis.**—*Quart. Bull. Mich. agric. Exp. Sta.* **17.** 224-225.

In the process of eradicating brucella infection from a herd of swine, the possibility of sparrows spreading the infection was investigated. Blood from 91 sparrows caught in the vicinity of affected cattle was examined by the Huddleson rapid agglutination method. Three showed slight agglutination in a dilution of 1 : 25, whilst 88 were negative. [There is no mention of attempts to isolate the organism]. Although not infected, it is possible that sparrows can act as mechanical carriers of infectious material.—N. J. SCORGIE.

PICARD, J. (1935). La fièvre ondulante en Crau et en Camargue. [**Undulant Fever in the Crau and the Camargue Districts, France**].—*Rev. Microbiol., Paris.* **1.** 597-612.

A record of observations carried out in the Rhône delta during a period of 12 years. A description is given of the type of country and the species of sheep and goat found there. The seasonal occurrence of the disease is associated with the periodical movement of the flocks of sheep and goats. The incidence is greatest in adult agricultural workers, and external contact with infected material is considered to be a more important cause than the consumption of infected milk.

More than 350 cases have been observed.

Prophylaxis and diagnosis are discussed.—F. H. MANLEY.

TAYLOR, R. M., & VIDAL, L. F. (1933). Quelques précisions épidémiologiques sur la fièvre ondulante en France. [**Some Observations on Undulant Fever in France**].—*1er Congr. int. Hyg. méditerranéenne, 1932.* **1.** 604-617. 9 tables. [1 ref.]

Undulant fever occurs throughout France. Very little investigation of the disease has been carried out in some areas and local figures are, therefore, not comparative. Isolated initial cases are usually followed by many similar diagnoses in new centres of disease. Out of 271 cases, there was a history of contact with cattle or of the use of milk or milk products in 28. Strains were isolated from 20 of these cases and 14 were found to be *Brucella melitensis*, and six the bovine strain of *Br. abortus.* All the latter strains were from isolated cases of disease, whereas only one of the *Br. melitensis* cases was an isolated one.

The incidence of undulant fever appears to be in proportion to the number of goats and sheep kept and the incidence of abortion among the animals. It does not conform to the amount of raw milk or cheese consumed. The authors

are of the opinion that any law to limit the distribution of raw milk and cheese would have little effect upon the incidence of undulant fever in France.—C. V. W.

—. (1935). **Anaerobes in Disease.**—*Med. J. Aust.* Oct. 12th. 497-498.

This was a discussion held at the 103rd Annual Meeting of the British Medical Association. WOODRUFF outlined the recognized anaerobic infections in ruminants and drew attention to the fact that special conditions are necessary to produce actual infection. OXER stressed the importance of fat body condition as a predisposing cause of these animal diseases. ADEY considered that the investigation of enterotoxaemia of sheep has shown that the toxin of *Clostridium welchii* may be absorbed through the intact mucous membrane in cases of obstruction of the human small intestine.—W. I. B. BEVERIDGE.

FREI, W. (1935). Ueber den Infektionsmodus der Anaeroben. [**Method of Infection of Anaerobes**].—*Schweiz. Arch. Tierheilk.* **77.** 567-579. [Numerous refs.]

The author divides anaerobic bacteria into those having a local action and those, like tetanus and botulinus types, which have a generalized action. The former group may be subdivided into those producing necrosis – *Actinomyces necrophorus* (the necrosis bacillus) – and those producing gas gangrene. All types are dependent for their successful development in the host or in culture upon the existence of a suitable oxidation reduction potential. The theory and practical application of oxidation reduction potentials are discussed [see this *Bull.* **1.** 237].
—E. J. PULLINGER.

MASON, J. H., & ROBINSON, E. M. (1935). **The Antigenic Components of the Toxins of** *Cl. botulinum* **Types C and D.**—*Onderstepoort J. vet. Sci.* **5.** 65-75. 7 tables. [15 refs.]

The work was carried out on six C types, one D type, one A and one B type, and would tend to show that in the C and D groups there is a sharing of toxic antigenic fractions. Goats were used in the production of antitoxins, the immunization being commenced with formol-toxoid. From the experimental data it has been shown that the toxins of the C and D groups contain more than one toxic component. Three fractions are concerned – 2 C fractions, C_1 and C_2, and the D. A small fraction of D toxin may occur in the C fractions and *vice versa*. It is possible that there are other fractions present. The A and B toxins are monospecific.

STEVENS, F. A. (1935). **The Dissociation of Cl. welchii.**—*J. infect. Dis.* **57.** 275-285. 25 figs., 1 table. [8 refs.]

By heating the inoculum and subcultivating on solid media the author was able to obtain variants from a laboratory strain of *Cl. welchii* which, he believes, correspond with the mucoid, rough and smooth variants of pneumococcus (DAWSON), and an additional small colony (" omega ") type which failed to yield growth when transferred. Delayed fission and greater length of individual bacilli were observed in comparing the variants in the order M, S, R and " omega ".
—R. S. ROBERTS.

SAHYUN, M., BEARD, P., SCHULTZ, E. W., SNOW, J., & CROSS, E. (1936). **Growth Stimulating Factors for Microörganisms.**—*J. infect. Dis.* **58.** 28-44. 8 tables, 1 chart. [Numerous refs.]

A brief summary of the literature dealing with the concept of growth-stimulating factors or " activators " is given, and it is pointed out that there is considerable variation in the chemical properties of the factors described by various workers. In this investigation, two methods were adopted for the preparation of bacterial activators from organic substances :– (1) extraction of peptone with 80 per cent. alcohol, and ultrafiltration of the extract through a cellophane membrane, giving an activator containing a butyl soluble and a butyl insoluble fraction, and (2) acid hydrolysis of blood, producing a highly active butyl insoluble growth factor.

Bact. coli is able to produce its own growth factor when grown on synthetic media, but its growth during the first 36 hours is slow, due to insufficient synthesis of the activator required for rapid growth. The effect of the artificially produced activators when added to the medium is to produce a great acceleration in the rate of growth of the organism.

The rate of utilization of various amino-acids by *Bact. coli* was also investigated. A large number of these were found to be growth-stimulating, but their effect was greatly enhanced by the addition of the activators described in the first part of the paper.—N. J. Scorgie.

Koser, S. A., Saunders, F., Finkle, I. I., & Spoelstra, R. C. (1936). **Studies on Bacterial Nutrition. II. The Distribution of a Growth Stimulating Factor in Animal and Plant Tissues.**—*J. infect. Dis.* **58.** 121-127. 3 tables. [20 refs.]

The previously recorded growth-promoting factors [this *Bull.* **6.** 116.] which, on addition to simple synthetic media, facilitated the growth of fastidious bacteria which would otherwise not grow on such media, have now been isolated from many animal and plant tissues. A list of about 30 sources is given, the richest being calf spleen, calf liver and yeast.—Gwilym O. Davies.

DISEASES CAUSED BY PROTOZOAN PARASITES.

French, M. H. (1935). **Tanganyika Territory. Nitrogen and Mineral Metabolism in *T. congolense* Disease.**—*Rep. Dep. vet. Sci. Tanganyika, 1934.* pp. 59-64. 7 tables.

Nitrogen and mineral balance experiments were carried out before inoculation with *Tryp. congolense* infection and again at the height of infection.

T. congolense infection results in an increased rate of excretion of nitrogen, Ca, and phosphates. Mg balance does not appear to be disturbed. The effect on sodium and chlorine is dependent on the level of intake ; on an adequate consumption retention follows, but a negative balance results on a low intake.—S. A. Evans.

Marchesi, F., Crainz, F., & Scapaticci, R. (1935). La leishmaniosi dei cani in Roma nella stagione estiva e autunnale. **[Canine Leishmaniasis in Rome in the Summer and Autumn].**—*Policlinico Sez. prat.* **42.** 841-842.

This note records a paper presented before the Academy of Medicine in Rome, and reveals that the authors found a leishmanial infection rate of 2·7 per cent. in dogs in the summer, whilst in the autumn it rose to 3·2 per cent. The seasonal prevalence of the disease is marked, showing a continuous rise from 0 per cent. in the winter to the peak of infection in the autumn. The authors consider that this is in accord with the theory that the dog forms the reservoir for human leishmaniasis.—U. F. Richardson.

REICHENOW, E. (1935). Uebertragungsweise und Entwicklung der Piroplasmen. [**The Transmission and Development of Piroplasms**].—*Zlb. Bakt. I.* (*Orig.*). **135.** 108-119. 1 table. [Numerous refs.]

This article briefly discusses the classification of piroplasms which are divided into the two genera *Babesia* and *Theileria*. A table is given showing the main species, the ticks through which the organisms are transmitted and the stage in the life-cycle of the tick at which they become infective. It is pointed out that, whilst the theileria are transmitted by the following tick stage to that which picked up the infection, the babesia are almost exclusively transmitted through the egg of the tick, actual infection being conveyed by ticks of the generation following that which received the infective feed. That babesia infections may be transmitted by succeeding stages of the same generation has been accepted, but the validity of such experiments is questioned in view of the fact that ticks infected as larvae or nymphs may carry infection through the next adult stage, and the egg, to the following generation. It therefore becomes necessary to experiment with ticks which have been kept clean for two generations ; when this has been done, as in the case of *B. motasi* and *Rhipicephalus bursa*, no infection has been produced by stage-to-stage feeding. In the majority of cases of transmission of babesia, the infection picked up by ticks of one generation passes through the egg to the second generation which, however, does not develop infectivity until it has reached the next adult stage. Probably the salivary gland may become infected in the larval and nymphal stages, but infection may be too light to be easily detected. One exception to this rule occurs in the case of the transmission of *B. bovis* by *Ixodes ricinus*, when the second tick generation exhibits infectivity in the larval and nymphal stages, but is said to have lost it before reaching maturity.

It is suggested that, in most cases, a species of piroplasm is only transmitted by a single definite species of tick. The multiplicity of carriers in such cases as *B. bigemina* and *B. canis* may be explained by the assumption that morphologically similar organisms may, in fact, be separate species. In support of this theory is adduced the evidence that strains of *B. canis* transmissible by *Rh. sanguineus* could not be transmitted through *Dermacentor reticulatus*, nor the *D. reticulatus* strain be passed through *Rh. sanguineus*. It is suggested that the fact that *Th. dispar* is transmitted by *Hyalomma mauritanicum* and not by species of *Rhipicephalus* is considerable support to its claim to identity as a species. It is also suggested that further work on transmitters may lead to a further division of species amongst organisms which appear morphologically identical.

Turning to the question of development, the author reiterates his inability to detect either sexual union, or phases of sporogony or schizogony in the life-cycle of *B. canis*. He suggests that the sporogony stages described by DENNIS for *B. bigemina* and by COWDRY and HAM in the case of *Th. parva* may be degenerative stages. It is also suggested that the " blue body " stages of *Th. parva* which have been explained as schizonts may, in fact, be the result of repeated binary fission.

—U. F. RICHARDSON.

CARPANO, M. (1934). Sur les piroplasmoses des carnassiers et sur un nouveau piroplasme des vélins [félins] (*Babesiella felis* chez le puma : *Felis concor*). [**Piroplasmosis of Carnivora, with a Note on a New Piroplasm from the Puma,** *Babesia felis*].—*Bull. Minist. Agric. Egypt.* No. 137. pp. 20. 12 figs. on 6 plates, 1 table. [21 refs.]

This article describes a piroplasm encountered in two pumas which had been sent from California to Port Said. The author believes that the infection was contracted at Port Said, the local felines being carriers of the parasite and *Rhipicephalus simus* the transmitting tick. The organism resembles *B. gibsoni* and the

name *Babesiella* [= *Babesia*] *felis* is suggested, it being considered that the organism encountered in a wild sudanese cat, and named *B. felis* by DAVIS, should be more properly named *Nuttallia felis*. [The genus *Nuttallia* is not universally accepted so that, if the species are accepted as distinct, the name *B. felis* should be reserved for DAVIS' piroplasm].—U. F. RICHARDSON.

ADLER, S., & ELLENBOGEN, V. (1935). **Observations on Theileriosis in Palestine.** —*Arch. Inst. Pasteur Algér.* **13.** 451-471. 2 tables. [10 refs.] [In English].

This article records observations and experiments on bovine theileriasis which is stated to be the disease of greatest economic importance to cattle in Palestine, and to cause a mortality of at least 40 per cent. in adult cattle attacked for the first time. It has been claimed that native cattle are practically resistant to the disease, but local calves inoculated with the virus proved as susceptible as calves of imported Dutch breeds. The parasite concerned has been previously referred to as *Theileria annulata* but is morphologically similar to *Th. dispar* and *Th. parva*. Ring forms are usually more numerous than comma forms, but it was noted that if a high proportion of comma forms were present the cases were exceptionally severe. The only direct change produced in invaded red cells is a lowering of the specific gravity with the result that, in centrifuged blood, the majority of infected cells are found in the superficial layers. Blood from infected animals invariably proved infective when inoculated subcutaneously into susceptible calves, and defibrinated blood, kept at 12°C., proved infective for at least 19 days. Scanty parasites were constantly found in the blood of recovered animals for a year, and if the previous history of the animal were not known such infections would be diagnosed as due to *Th. mutans*. Two attempts to infect buffalo calves by inoculation gave negative results. The incubation period after inoculation of calves usually varied between 17 and 23 days, but in seven cases was prolonged to three and six months. The symptoms in these seven cases appeared suddenly and all the animals died within two days. It is suggested that a mild infection with scanty parasites or a long incubation period is associated with sensitization and a rapid and fatal infection.

Calves are more resistant to the disease than adult cattle, and recovery from one attack confers a tolerance to the parasite lasting for at least one year. The Algerian *Th. dispar* strain differs from the Palestine strain in that it will not survive outside the body more than 11 days and that parasites do not persist in recovered animals. No cross-immunity was conferred by either the Palestine or Algerian virus to the other, though previous infection with the latter diminished the mortality from a subsequent infection with the former.

Splenectomy before inoculation did not increase the susceptibility of the animals, nor did the removal of the spleen cause a recrudescence of symptoms in animals recently recovered from an acute attack of the disease.

It is suggested that in immunity to this disease two factors are involved, one inhibiting the multiplication of the parasites and the other inhibiting the toxic symptoms.—U. F. RICHARDSON.

GOUSSEFF, W. F. (1935). Ueber die Iktero-Hämoglobinurie (infektiöse Gelbsucht). [**Infectious Jaundice of Cattle**].—*Arch. wiss. prakt. Tierheilk.* **70.** 79-85.

This article records the treatment of cattle suffering from infectious jaundice with " novarsenol " and other similar preparations. All the treated animals recovered, except those treated at the final stage of the disease. The mortality in untreated calves was 50 per cent. and there was also considerable mortality in untreated cows.

The disease was characterized by fever, loss of appetite, icteric coloration of the mucous membranes and body fat, a reddish-brown discoloration of the urine and, in the later stages, emaciation and desquamation of the skin, particularly of the ears. The liver was enlarged and clay-coloured on section, the kidneys were swollen and dark blood-red in colour and the mesenteric lymph glands were haemorrhagic. Haemorrhages were often encountered in the pericardium, endocardium, kidney tissue or spleen. The mucous membrane of the abomasum and small intestine was swollen and covered with mucus.

The symptoms and pathological anatomy agree with disease outbreaks ascribed by other authors to spirochaetes, but in this outbreak no spirochaetes were detected by the examination of blood smears which were taken daily, or by occasional examination of material from the liver, spleen, kidneys, lung or lymph glands. The author suggests that spirochaetes might have been detected if examination had been made at the very beginning of an attack.—U. F. RICHARDSON.

SCHÜFFNER, W., KOTTER, G. F., & SCHULTSZ, D. (1935). Ervaringen over menschelijke besmettingen met hondenleptospiren (*L. canicola*). [**Human Infection with a Canine Leptospira** (*L. canicola*)].—*Geneesk. Tijdschr. Ned.-Ind.* **75.** 534-548. 1 fig., 3 tables, 6 charts. [6 refs.]

In Holland two different types of pathogenic leptospira are known, the one being found in rats and dogs (*L. icterohaemorrhagiae*) and the other (*L. canicola*) being found in the dog, but not in the rat.

There are four principal features when defining the essential nature of *L. canicola* infection :– (1) icterus is seldom seen ; (2) the difficulty in effecting the first passage in the guinea pig ; (3) the low or total absence of susceptibility in tame and wild rats, and (4) the special antigenic properties of the organism.

Six cases of human infection with this spirochaete are described. The disease very often runs a chronic course, with renal affection and a chronic uraemia which ends fatally. Infection in man, which cannot plausibly be attributed to bathing water, is probably caused by the ingestion of contaminated drinking water and food.

—M. J. J. HOUTHUIS (ROTTERDAM).

—. (1935). De leptospiroses bij de hond en de betekenis van de Leptospira canicola. [**The Identity of Leptospira from Dogs**].—*Tijdschr. Diergeneesk.* **62.** 310-311. [1 ref.] [English, French and German summaries : abst. from orig.]

Fifty cases of leptospira infection in dogs, having an acute or a chronic course, were examined [see also preceding abstract]. In 64 per cent. of the cases the leptospira could be identified immediately by examination of the urine by dark field illumination. In most cases the infection was not due to the classical leptospira of WEIL. In dogs with the complex of symptoms called the azotemic uraemia syndrome, *L. canicola* is responsible for the infection in 90 per cent. of cases. This spirochaete does not cause jaundice and it is not found in rats.

—M. J. J. HOUTHUIS (ROTTERDAM).

DISEASES CAUSED BY VIRUSES.

—. (1935). **Virus Disease.**—*Med. J. Aust.* Oct. 12th. 498-499.

In this discussion at the 103rd Annual Meeting of the British Medical Association, BURNETT pointed out that attacks of any infectious disease can be divided into frank and inapparent forms, the latter being mild or completely

asymptomatic infections. In the case of most long-established endemic diseases, a large proportion of infections by the specific virus produce only an inapparent but immunizing infection.

WARD considered that, in cases of long-standing immunity, the virus probably persisted in the cells.

BULL postulated that the reason for viruses giving rise to a stronger and more lasting immunity than bacteria was that the former are intracellular parasites.
—W. I. B. BEVERIDGE.

WOHLFEIL, T. (1935). Neuere Anschauungen über die Natur der infektiösen Virusarten. **[New Views on the Nature of Viruses].**—*Med. Welt.* **9.** 551-554.

A conveniently brief summary for the general medical reader. The writer touches upon the probable nature of viruses, the methods of determining their size, and so on.—E. WESTON HURST.

CURASSON, G. (1935). La vaccination contre la peste bovine à l'aide du mélange virus-saponine. **[Vaccination against Rinderpest with Saponinized Virus].** —*Bull. Soc. Path. exot.* **28.** 912-914. [2 refs.]

Saponinized virus is made by allowing minced pulp of spleen or lymphatic glands of an animal infected with rinderpest to macerate for two to three hours in normal saline. The supernatant fluid is then mixed with a 2 per cent. saponin solution and the mixture inoculated subcutaneously within one and a half hours of making up. The vaccine should be used at a dose of not less than 2 c.c., and it has been found in practice that asepsis is not so essential as the author first believed. Inoculation is followed in two to six days by a febrile reaction and the formation of an oedematous swelling at the seat of the injection. Experimentally it was proved, in one case, that the oedematous fluid contained the rinderpest virus. On inoculation with virulent blood 13 days later three calves, out of 29 vaccinated, gave a distinct febrile reaction, ten showed fleeting elevation of temperature, and the remainder gave no reaction. The author suggests that the saponin has the power of restricting the spread of the rinderpest virus and limiting its multiplication to the oedematous local swelling.—U. F. RICHARDSON.

I. INOUE, T., & UMEZU, M. (1935). **Studies on the Physical, Chemical and Cytological Properties of the Blood in Rinderpest.**—*J. Jap. Soc. vet. Sci.* **14.** 139-188. 21 tables, 38 charts. [11 refs.] [In Japanese: abst. from English summary].

II. UMEZU, M., & INOUE, T. (1935). **On the Changes in the Quantity of Glycogen, Lactic Acid and Adrenalin in the Organs, during the Course of Rinderpest.**—*Ibid.* 189-193. 3 tables. [6 refs.] [In Japanese: abst. from English summary].

In both these articles observations were made on calves artificially infected with rinderpest.

I. The specific gravity and viscosity of the blood decrease as the fever progresses and then begin to rise again as the temperature falls. The blood cell count and haemoglobin content also fall with fever and rise again with its decline. Chlorine decreases steadily until death; cholesterin and sugar behave like the blood count; lactic acid and fibrin increase with the fever and decrease with its decline, and the albumin and globulin decrease slightly during the course of fatal rinderpest. Non-protein nitrogen increases suddenly with the decline of fever.

II. In calves killed at the height of rinderpest it was found that the glycogen

in the liver is greatly reduced but not that in the heart muscle ; lactic acid increases in both liver and heart. The adrenalin content of the adrenals decreases with fever.—J. E.

—. (1935). Prusse. Circulaire du Ministre de l'Agriculture concernant l'anémie contagieuse des équidés. [**Prussia. Circular from the Ministry of Agriculture concerning Equine Infectious Anaemia**].—*Bull. Off. internat. Epiz.* **11.** 353-372.

This ministerial circular sets out the methods of diagnosis of equine infectious anaemia, *e.g.* clinical examination, blood tests and microscopic examination of faeces and worm eggs. After *post-mortem* examination portions of the liver, spleen and kidney, the left auricle of the heart, lymph nodes of the spleen and any other infected lymph nodes must be sent to the Veterinary High School, Berlin. Full details are given for the taking and preserving of the specimens, with a form showing the routine of the *post-mortem* examination. All cases or suspected cases of the disease must be notified, careful disinfection is enjoined, and slaughter may take place only in specially approved places. The veterinarian must also report whether the disease is likely to be spread by infected water supply, and all infected premises must be inspected at least once every four weeks. Isolation of animals may be discontinued (a) after the elimination of all clinically affected solipeds, if the rest of the stock has not for two months shown any apparent clinical signs of the disease, and (b) if all the solipeds of a farm, in which there remain clinically affected animals, have for three months shown no suspicious clinical sign of the disease. Suspected animals are isolated for six weeks under police and veterinary supervision, and are only released when more than six weeks have elapsed since the last possibility of contamination and no clinical signs have been observed. —F. Bullock.

Bauer, J. H., Cox, H. R., & Olitsky, P. K. (1935). **Ultrafiltration of the Virus of Equine Encephalomyelitis.**—*Proc. Soc. exp. Biol., N.Y.* **33.** 378-382. 4 tables. [9 refs.]

Emulsions of virulent mouse brain or tissue culture material in equal parts of hormone broth, ascitic fluid and distilled water were filtered through graded collodion membranes, under positive pressure of nitrogen of 100 cm. Hg, and with effective filtration areas of 5 cm^2 : 8 to 10 c.c. of filtrate were collected. The virus [eastern and western strains] passed membranes, previously " lined " with 4 c.c. of broth, of average pore diameter of 66 $m\mu$, but was completely retained by those of 60 $m\mu$. Thus it has the same particle size as that of St. Louis encephalitis (20 to 30 $m\mu$).—E. Weston Hurst.

Cox, H. R. (1936). **Tissue Cultures as a More Sensitive Method than Animal Inoculation for Detecting Equine Encephalomyelitis Virus.**—*Proc. Soc. exp. Biol., N.Y.* **33.** 607-609. 1 table. [2 refs.]

Its capacity for growth in minced chick embryo suspended in Tyrode's solution is a more sensitive test for the presence of the eastern strain of virus than is intracerebral inoculation of mice and guinea pigs. Much larger inocula can be tested. Immunizing doses (1 c.c.) of formolized vaccine (neutralized with ammonia) contained no detectable active virus.—E. Weston Hurst.

Brueckner, A. L., Poelma, L. J., Everson, C. L., & Reed, R. C. (1934). **Equine Encephalomyelitis.**—*Bull. Md agric. Exp. Sta.* No. 369. pp. 137-146. [10 refs.]

The equine encephalomyelitis outbreak in and near the tidewater section of Maryland [Virginia, Delaware and New Jersey] in 1933 was preceded by heavy rainfall and tidal floods; mosquitoes, etc., appeared in dense swarms and epidemiological considerations suggested them as vectors. From the brains of fatal cases the [eastern] virus was obtained. The symptomatology is re-described; one diagnostic difference from botulism (forage poisoning) was the absence of pharyngeal paralysis, and consequent regurgitation of masticated food. The course was usually acute or subacute. The morbidity rate among horses on affected farms was 12 per cent., with a mortality rate of 83 per cent.; the most healthy young horses often seemed first affected. A mare might be affected without her foal, and *vice versa*. Mules were much less susceptible. Antiserum against the western virus did not neutralize the eastern virus *in vitro* and had no prophylactic or curative value.—E. Weston Hurst.

Peters, G., & Yamagiwa, S. (1936). Zur Histopathologie der Staupe-Encephalitis der Hunde und der epizootischen Encephalitis der Silberfüchse. [**Histopathology of Dog Distemper Encephalitis and Epizootic Encephalitis of Silver Foxes**].—*Arch. wiss. prakt. Tierheilk.* **70.** 138-152. 9 figs. [Numerous refs.]

Examination of the central nervous system of 16 dogs which had died of the nervous form of distemper revealed an encephalitis which was characterized by perivascular infiltration by round and plasma cells, vascular proliferation, and formation of localized foci of glia cells.

Similar changes were found in cases of epizootic encephalitis in foxes.

In dogs which had shown convulsions during life there were circumscribed areas of ganglion cell destruction closely resembling similar lesions found in convulsive diseases in man.

In a few of the dogs and foxes examined, the so-called "Encephalitozoota" of previous workers were found. The focal changes which were observed in these animals are considered as probably representing an inflammatory reaction to the presence of the " parasites ".—E. G. White.

Verge, J., & Goret, P. (1935). La gastro-entérite infectieuse du chat. [**Infectious Feline Gastro-Enteritis**].—*Rev. gén. Méd. vét.* **44.** 641-653. 1 chart. [Numerous refs.]

This article is a general review of feline infectious enteritis. The condition is now generally recognized as due to a filtrable virus first described by Verge and Cristoform [(1928). *C. R. Soc. Biol. Paris.* **99.** 312.] and has been definitely separated from cat distemper. The disease occurs in peracute, acute and subacute forms and is characterized by haemorrhagic or ulcerative lesions of the small intestines, congestion, oedema and ecchymoses in the lungs and hypertrophy of the lymph glands. The virus is present in the blood stream for a short time and is also found in most of the organs, including the brain.

Cats can be immunized by a formalinized vaccine prepared from the spleen or other organs, or by hyperimmune cat serum. Excellent results have also been obtained by the simultaneous serum-virus method, but it is essential to use a homologous immune serum. Nevertheless, in spite of the promising results which have been obtained, Verge points out that a much larger series of observations must be made before the value of these methods can be accurately assessed, especially when killed virus is used as an immunizing agent. There are also numerous technical difficulties to be overcome, among which the following are

cited :– the maintenance of abundant sources of potent virus, difficulty of preserving and titrating the virus, faults associated with poor immunity from dead virus, dangers of infection and creation of carriers by sero-vaccination, practical difficulties in the preparation of homologous serum and low antibody content of heterologous serum.—R. E. GLOVER.

VAN DER SCHAAF, A. T. (1935). Over verwantschap van het griepvirus en het virus van Carré (hondenziektevirus). [**Relationship between the Viruses of Human Influenza and Dog Distemper**].—*Tijdschr. Diergeneesk.* **62.** 635-638. [9 refs.] [English, French and German summaries : abst. from orig.]

The virus of influenza can infect ferrets only through the nose. The virus of dog distemper can infect by inhalation, ingestion and also by intracutaneous and subcutaneous injection. The virus of human influenza is only to be found in the respiratory mucous membrane ; distemper virus is present in all the organs and liquids of the body. Experiments carried out by EICHHORN and PYLE, repeated with 14 ferrets, showed that infection with human influenza virus, preceding an infection with distemper virus, increases the resistance against the latter infection in so far that the disease runs a less acute course and that there is a longer interval before the ferret dies of distemper. The paper is merely a survey.

—M. J. J. HOUTHUIS (ROTTERDAM).

ELFORD, W. J., ANDREWES, C. H., & TANG, F. F. (1936). **The Sizes of the Viruses of Human and Swine Influenza as Determined by Ultrafiltration.**—*Brit. J. exp. Path.* **17.** 51-53. 2 tables. [7 refs.]

The results of filtration through gradocol membranes suggest a probable size for both viruses of from 80 to 120 $m\mu$. It is thus extremely unlikely that the virus represents a small form of *Haemophilus influenzae*.—E. WESTON HURST.

ARMSTRONG, C., & HARRISON, W. T. (1936). **Prevention of Experimental Intranasal Infection with Certain Neurotropic Viruses by Means of Chemicals Instilled into the Nostrils.**—*Publ. Hlth Rep., Wash.* **51.** 203-215. 5 tables. [9 refs.]

Single and repeated intranasal instillation of 0·32 to 0·64 per cent. picric acid (the most effective of many chemicals tried) was devoid of local irritating action; it tended to protect against subsequent intranasal infection with St. Louis encephalitis virus in mice, and with poliomyelitis virus in monkeys. In the latter, protection lasted at least four to seven days. A large proportion of the mice later resisted intracerebral inoculation.—E. WESTON HURST.

HIRT, G. (1935). Beiträge zur Aujeszkyschen Krankheit der Saugferkel. [**Aujeszky's Disease of Sucking Pigs**].—*Arch. wiss. prakt. Tierheilk.* **70.** 86-94. 4 figs. [2 refs.]

Aujeszky's disease can attack sucking pigs as well as adult swine [this *Bull.* **5.** 72.] and, in the young animals, the infection can take the form of a serious epidemic, since about 40 per cent. of young stock are liable to develop infection. In these animals, the chief symptoms are of a nervous type, including partial paralysis and loss of co-ordination. Piglets are relatively more susceptible than adults and it is estimated that approximately 95 per cent. of those infected die. Infection generally occurs between the ages of two and five weeks.—E. J. P.

METIVIER, H. V. M. (1935). **Paralytic Rabies in Livestock.**—*J. comp. Path.* **48.** 245-260. 7 figs. [11 refs.]

This article is essentially a general survey of paralytic rabies in Trinidad, with special reference to clinical symptoms, aetiology, transmission and prophylaxis.

The disease, which is believed to be of comparatively recent origin, is now wide-spread, with a mortality up to 20 per cent. From 1929 to 1931, the annual death rate in animals averaged over 1,000 cases, 90 per cent. being recorded in bovines. Horses, goats, sheep, swine and, occasionally, dogs were also affected.

The condition was, at an early date, proved to be non-contagious. At first, botulism was suspected, but the impossibility of reproducing the condition by cultures, and the failure of antitoxin to arrest the outbreaks, seemed to negative this suggestion. Subsequent investigations, moreover, showed that a rabies virus was present in the brains of infected animals. The nature of the virus was confirmed by HURST, FLEXNER, ANDREWS, KRAUSE, FINZI and by REMLINGER and BAILLY.

Since the wholesale destruction of stray dogs and a prohibition on the importation of animals failed to check the disease, other means of transmission were examined and, finally, two species of bats were proved to be affected with the virus. The main vector is *Desmodus rufus*, a vampire bat feeding exclusively on mammalian or avian blood, but the fruit-eating bat, *Artibeus planirostris trinitatis*, may become infected under natural conditions.

The symptoms are varied, but all animals eventually become paralysed. In cattle, the paralytic form predominates, but in horses a stage of excitement may precede the paralysis. Death usually occurs three to five days after the first symptoms are noticed. At *post-mortem* examination, the main changes are congestive lesions in the brain and meninges and, in some cases, a softening of the cord in the lumbar region. Sections show perivascular infiltrations and degeneration of nerve cells. Negri bodies are sometimes present in large numbers but are not always seen. The virus can be transmitted to rabbits, guinea pigs, calves and dogs.

In view of the impossibility of controlling outbreaks by the destruction of carrier bats, the best protection is afforded by the construction of bat-proof shelters and by the provision of bright illumination at night. Large-scale experiments on the preventive inoculation of susceptible animals with a carbolized suspension of fixed virus have given encouraging results. The danger of vaccinating animals in the early incubative stages of the disease is pointed out.—R. E. GLOVER.

COOK, R. A. (1935). **Is Rabies always Fatal?**—*N. Amer. Vet.* **16.** No. 3. 46-47.

Four case records are given of what was clinically diagnosed as rabies in dogs. Two dogs recovered and two were killed as a precaution. One was a puppy which, after showing furious rabies for five days, became normal again for three days, but later was destroyed on account of diarrhoea and rectal prolapse. Negri bodies were seen in sections of its brain, but the brain was not examined in any of the other cases.—J. E.

LEVADITI, C., & SCHOEN, R. (1936). Négrigenèse et régénérescence épithéliale. **[Negri Bodies in the Cornea in Experimental Rabies].**—*C. R. Soc. Biol. Paris.* **121.** 716-718. [4 refs.]

The corneal epithelium of one eye was destroyed by a local vaccinial lesion and allowed to regenerate. Introduced intracerebrally, a street rabies virus induced equal development of Negri bodies in the two corneae. Introduced by scarification, the virus tended to produce fewer Negri bodies in the previously affected eye than in the normal one.—E. WESTON HURST.

PROCA, G., & JONNESCO, D. (1935). Sur une modification durable du virus rabique de passage. **[Lasting Modification of Fixed Virus].**—*C. R. Soc. Biol. Paris.* **120.** 1274-1276. [1 ref.]

Antiserum-treated mice inoculated intracaudally developed rabies after 42 and 57 days respectively. During some score passages by various routes in rabbits, guinea pigs and dogs, the viruses isolated gave abnormally long incubation periods ; they had also regained the power to produce Negri bodies. While not absolutely stable, this modification resembled a true mutation in its sudden development.
—E. WESTON HURST.

—. (1935). Organisation d'un service d'étude de la vaccination antirabique des chiens en Indochine. **[Commission for Vaccination of Dogs against Rabies in Indo-China]**.—*Rec. Méd. vét. exot.* **8.** 118-123. [1 ref.]

In 1932 the Governor-General of Indo-China appointed a commission to examine the question of state control of antirabic vaccination of domestic animals. This article gives details of the lines on which enquiries are being conducted and more particularly the allocation of research among the three Pasteur Institutes of the colony. Two of these are charged with the study of the virus itself, especially those aberrant forms which are known to exist. The third is concerned with vaccination, choice of method and the special features of the selected procedure. A formolized vaccine is the one favoured.

The remainder of the paper is a discourse on legislation in regard to antirabic vaccination which has been adopted in other French colonies and the procedure in force in France itself.

The article contains no true scientific matter and is chiefly of interest from the point of view of veterinary administration.—C. DAVENPORT.

CRUVEILHIER, L., NICOLAU, S., & KOPCIOWSKA, L. (1935). Action du traitement antirabique pastorien envisagé au point de vue expérimental. **[The Action of the Pasteur Antirabies Treatment from the Experimental Point of View]**.—*Ann. Inst. Pasteur.* Rabies Suppl. pp. 200-221. 15 figs. [13 refs.]

Persons vaccinated against rabies after being bitten have often reported an improvement in general health, quite apart from the question of rabies. Experiments were, therefore, performed on rabbits to test the beneficent non-specific action of the standard Pasteur treatment. It was found that the latter intensifies the production of agglutinins in animals vaccinated against typhoid, intensifies the formation of haemolysins and improves the growth of normal young rabbits.

The protective action of the Pasteur treatment was also tested against intrasciatic inoculation of rabies virus and the histological changes of the central and peripheral nervous system after Pasteur treatment were studied. The original text and figures should be consulted for the latter findings.—J. E.

ALEXANDER, R. A., & NEITZ, W. O. (1935). **The Transmission of Louping Ill by Ticks** (*Rhipicephalus appendiculatus*).—*Onderstepoort J. vet. Sci.* **5.** 15-33. 1 fig., 2 tables. [3 refs.]

The susceptibility of cattle to " louping ill " was tested by intrathecal injection. A febrile reaction resulted, in some cases accompanied by severe symptoms of a nervous type, ending in paralysis. In the case of a horse which had been infected by putting ticks on the ears, a febrile reaction resulted, accompanied by symptoms of cyanosis, rapid breathing and diarrhoea. The transmission experiments with ticks carried out on sheep showed that (1) larvae pick up the infection and transmit it as nymphae ; (2) nymphae pick up the infection for transmission as adults ; (3) the infection does not pass through the egg ; (4) infective nymphae tend to lose their infection by feeding on immune animals or even susceptible animals,

and (5) clean ticks do not acquire infection when feeding on an immune animal simultaneously with infective ticks.—E. M. Robinson.

I. Lépine, P. (1936). Neurotropisme de la peste aviaire. [**Neurotropism of Fowl Plague Virus**].—*C. R. Soc. Biol. Paris.* **121.** 509-510. [8 refs.]

II. Lépine, P., & Sautter, V. (1936). Existence de lésions nucléaires spécifiques dans la peste aviaire. [**Specific Nuclear Lesions in Fowl Plague**]. —*Ibid.* 511-512. [4 refs.]

I. The virus of fowl plague possesses definite neurotropic affinities in the mouse and the rabbit. In both species, serial intracerebral passage is possible, in the mouse with 40 to 50 per cent. mortality. Following inoculation by peripheral routes, the virus may be found in the brain after it has disappeared from the general viscera ; but it does not multiply locally or invade the nervous system after intrasciatic inoculation in the rabbit.

II. In the livers of fowls suffering from less fulminating infections (lasting more than 30 hours), oxyphilic nuclear inclusions not unlike those found in yellow fever were present. Their focal distribution corresponded to the areas showing fatty degeneration in slower infections (five to six days). None were found in the brains of fowls or rabbits ; occasional nerve cells at the third mouse passage contained them.—E. Weston Hurst.

Lépine, P., Basset, J., & Macheboeuf, M. (1936). Action des ultrapressions sur le virus de la peste aviaire. Pouvoir antigène du virus ultrapressé. [**The Effect of Ultra-High Pressures on the Virus of Fowl Plague. Antigenic Power of the Product**].—*C. R. Soc. Biol. Paris.* **121.** 202-203. [3 refs.]

The virus of fowl plague resists a pressure of 2,000 atmospheres acting for 30 minutes, is attenuated at 3,000 to 3,500 atm., and is killed in the same time at 4,000 atm. In this respect it resembles other viruses, rather than ferments or toxins which withstand much higher pressures. Large doses so inactivated confer only slight relative immunity.—E. Weston Hurst.

Delpy, L., & Rafyi. (1936). Diffusion du virus claveleux, obtenue par addition d'extrait testiculaire. [**Diffusion of Sheep Pox Virus by the Addition of Testicular Extract**].—*C. R. Soc. Biol. Paris.* **121.** 721-722. 1 table. [1 ref.]

Testicular extract (Duran-Reynals factor), added to infective material given subcutaneously to lambs in Persia, induced diffusion of the virus with increase in size of the resulting lesion. It did not increase the virulence, or prevent the progressive attenuation with passage, of the virus.—E. Weston Hurst.

Kunert, H. (1935). Die Züchtung des Variola-Vaccinevirus Stamm Berlin auf der Chorion-Allantois der Hühnerembryo. [**The Cultivation of Vaccinia Virus on the Chorio-Allantoic Membrane of the Chick Embryo**].—*Z. Hyg. InfektKr.* **117.** 216-228. 14 figs., 1 table. [13 refs.]

The Berlin strain of vaccinia virus was cultivated for 50 passages on the chorio-allantoic membrane of the chick embryo. The virulence of the virus decreased independently of bacterial contamination, but could be restored by two passages in the rabbit. When stored for six months at –18°C., the culture virus lost part of its virulence, but was still capable of growth. The macroscopic and microscopic changes in the membrane are described ; the latter include the formation, in ectodermal cells, of structures resembling Guarnieri bodies. Though numerous in direct smears, elementary bodies were not demonstrated in sections.

Of 29 embryos examined, none showed elementary bodies in smears of the brain ; four livers and five spleens were positive. The centrifuged amniotic fluid was positive in two instances (one doubtful).—E. WESTON HURST.

GRAHAM, R., & BARGER, E. H. (1936). **Studies on Incubator Hygiene IV. A Note on the Virucidal Effect of Formaldehyde on Fowl Pox Virus.**—*Poult. Sci.* **15.** 48-52. 2 figs.

To determine the virucidal properties of formaldehyde on fowl pox virus a series of ten fumigation experiments was carried out, and the results showed that in the amounts recommended in incubator fumigations for the suppression of incubator-disseminated *Salmonella pullorum* infection, formaldehyde proved valuable in the destruction of fowl pox virus.

Fowl pox virus in a 1 per cent. aqueous suspension on cotton wool squares, and on the feet and down of day-old chicks, was subjected to routine incubator fumigation (formaldehyde released from cheese cloth in amounts of 20 c.c. per 100 cubic feet) and survived for 30 minutes, 45 minutes and 50 minutes, but was consistently non-infective after 90 minutes.

The infectivity of the fowl pox virus after fumigation for 30 and 45 minutes was not appreciably altered. Fowl pox virus rendered non-infective by formaldehyde fumigation did not appear to retain antigenic properties, and when applied to chicks did not give a measurable degree of protection against artificial exposure to fowl pox.—R. F. GORDON.

YAOI, H., & NAKAHARA, W. (1935). **Ultrafiltration Experiments on the Filterable Agent of Rous Chicken Sarcoma.**—*Jap. J. exp. Med.* **13.** 757-765. 7 figs. on 3 plates, 1 table. [12 refs.] [In English].

Ultrafiltration experiments were carried out on the agent of Rous sarcoma in accordance with Elford's technique. Special attention was given to removal of the mucinous substance that characterizes all Rous sarcoma extracts, and this was satisfactorily accomplished by precipitation with gelatin at an acid reaction followed by filtration through paper pulp and sand. Transmission tests were carried out on very young chickens, of approximately 200 g. weight, the amount of filtrate given varying from 4 to 7 c.c. To enhance the action of the filtrable agent, filtrates were first mixed with sterile glass powder.

Membranes with an average pore diameter of $0{\cdot}2\mu$ were found to be permeable to the Rous agent whilst those with an APD of $0{\cdot}14\mu$ completely retained the agent. The actual size of the Rous sarcoma agent is estimated to lie between 0·07 and $0{\cdot}105\mu$ (much nearer the former figure) so that the agent is outside the limits of resolution by visible light. Whether the elementary bodies of LEDINGHAM and GYE [this *Bull.* **5.** 631.] represent the agent artificially enlarged by the process of staining or other procedure is a moot point.—J. W. EMSLIE.

PATTERSON, F. D. (1936). **Fowl Leukosis.**—*J. Amer. vet. med. Ass.* **88.** 32-44. 7 tables. [5 refs.]

This paper discusses the results of previous experiments carried out on fowl leucosis by the author and other workers. It does not include the original research data which is tabulated in two previous papers [this *Bull.* **4.** 439, and **6.** 537]. Studies were made on over 2,000 fowls and approximately 850 were diagnosed as affected with fowl leucosis. The pathology of the different types of the disease is described and a brief summary of various transmission experiments given.

From the studies of the author and his collaborators, they conclude that the myeloid, erythroid, lymphoid, nerve and eye types of fowl leucosis are different

manifestations of the same disease. They claim that the disease in all its types can be transmitted by the injection of suspensions prepared from fresh fowl leucosis material, by direct and indirect pen contact, and by rearing susceptible chicks on infective litter. It is doubtful if the disease is often, if ever, transmitted directly through the egg, but inheritance does appear to be of great importance in regard to the degree of resistance and susceptibility of fowls. The evidence suggests that the causal agent is of the nature of a filtrable virus.—R. F. GORDON.

I. BENGTSON, Ida A., & WOOLEY, J. G. (1936). **Cultivation of the Virus of Lymphocytic Choriomeningitis in the Developing Chick Embryo.**—*Publ. Hlth Rep., Wash.* **51.** 29-41. 7 tables, 1 chart. [3 refs.]

II. LILLIE, R. D. (1936). **Histopathologic Reaction to the Virus of Lymphocytic Choriomeningitis in the Chick Embryo.**—*Ibid.* 41-42. [5 refs.]

I. The virus of lymphocytic chorio-meningitis was cultivated in developing eggs, using virulent mouse brain suspensions as inoculum. Eight passage experiments were secured without difficulty, serial dilutions of the chorio-allantoic membranes and of the embryo brains being tested on mice after each passage. At the end of the experiment, it was computed that the virus in the brain was present in a dilution of at least 1×10^{-23} of the original virus, and in the membrane in a dilution of at least 1×10^{-21}. The virus was less virulent for the embryos than for mice, since the former survived for an appreciably longer period, and was entirely non-infective for newly hatched chicks. The identity of the culture virus was checked by serum neutralization experiments.

II. The tissues from the embryos used in the preceding experiments were examined histologically. The chorio-allantoic membrane was irregularly oedematous and showed a moderate infiltration with pseudo-eosinophile leucocytes. Infiltrative lesions were also found in most of the organs of the embryo. Generally speaking, the reactions were not marked and bore little resemblance to the lesions seen in mice and in monkeys.—R. E. GLOVER.

LARSON, C. L., SHILLINGER, J. E., & GREEN, R. G. (1936). **Transmission of Rabbit Papillomatosis by the Rabbit Tick, Haemaphysalis leporis palustris.** —*Proc. Soc. exp. Biol., N.Y.* **33.** 536-538. [7 refs.]

Fifty nymphs fed for 24 hours in the vicinity of a rabbit (cottontail) papilloma [this *Bull.* **6.** 518.] were transferred to one ear of a clean animal for five days. Papillomata appeared on the ear in question in 21 to 24 days. Introduced by scarification, faecal material from infective ticks was innocuous. The experiment demonstrates only mechanical transfer.

Attempts at transmission with fleas, wood ticks and larval rabbit ticks were negative.—E. WESTON HURST.

KRUEGER, A. P. (1936). **The Nature of Bacteriophage and its Mode of Action.**—*Physiol. Rev.* **16.** 129-172. 1 chart. [Numerous refs.]

Bacteriophage (or more simply " phage ") investigations have been utilizing in recent years, to a steadily increasing degree, the methods of general physiology and biochemistry. In this comprehensive paper the author surveys these investigations, especially such as have a bearing on the nature of phage and the mechanisms of the bacterium-phage reactions. The following is a brief summary of the more important of his conclusions :–

In ordinary preparations phage is in the form of a colloidal suspension. Various phages differ in particle size, the range generally being from 10 to 75$m\mu$. It is probable that the extent of variation in any given preparation is less than has

been assumed previously. There is experimental evidence both for and against the view that phage consists of an active principle carried on some inert colloidal particle.

The majority of phages are readily destroyed by exposure to moderately high temperatures. The inactivation process follows the course of a monomolecular reaction and has the high critical thermal increment uniquely characteristic of protein denaturation, suggesting that the inactivation involves protein denaturation as an important phase of the phenomenon.

It has been demonstrated that phage adaptation to the action of injurious chemicals can be readily and regularly produced. The positive results recorded have been emphasized repeatedly as indicating the living nature of phage, but it is noteworthy that in many cases the extent of the adaptation was very limited and was frequently well within the limits of experimental error. Also it is a well-known fact that a given phage will display considerable variation in its behaviour when tested over a period of time. In the author's opinion clear-cut evidence of phage adaptation remains to be presented.

Summing up such evidence as is at present available with regard to the interaction of phage and bacteria, the following points appear to be definitely established:– (a) when phage and living bacteria are brought together the phage rapidly attaches itself to the cells until an equilibrium is established between the cellular fraction and that free in solution ; this linkage to bacteria is dissociable ; (b) as bacterial growth begins the formation of phage commences : cell division seems to be the essential factor for phage formation, and (c) the rate of phage production is considerably greater than that of bacterial reproduction. Consequently the ratio of phage to bacteria continually increases and finally attains the critical level requisite for lysis.

There seems to be no doubt that phage is an independent antigenic substance. A crude phage lysate injected parenterally into an animal causes the appearance in the serum of antibodies active against both the phage and the bacterial components of the lysate. The antiphage substances specifically neutralize phage and flocculate the phage particles, while those developed against the bacteria consist of agglutinins, precipitins, opsonins and complement-fixing antibodies. Purified phage does not evoke the production of antibacterial substances, but causes agglutinins and neutralizing substances active against phage to appear in the serum.

At the moment there exists no clear-cut experimental evidence that phage can be derived from phage-free bacterial strains, and the main argument which might be advanced to support the " non-living " theory is consequently inadequately backed. But the protagonists of the " non-living " theory can muster the following facts to bolster their position :– (1) phage does not possess the power of assimilation : it appears to lack an independent metabolism, and (2) phage is not adaptable. Though the origin of phage remains obscure, to the author the known facts seem to favour a bacterial origin.

There seems to be no reasonable doubt that there is not one phage but many phages, each possessing individual characteristics which under set conditions are fairly constant and which vary widely from phage to phage. Many workers are of the opinion that the term " bacteriophage " includes species just as definite as bacterial species and, like them, labile in certain characteristics.—A. Robertson.

Levine, P., & Frisch, A. W. (1935). **Polyvalency Demonstrated by Antiphages.** —*Proc. Soc. exp. Biol., N.Y.* **32.** 886-888. 1 table. [5 refs.]

The authors show that antiphages may be used to demonstrate the presence in a phage of several fractions.

Their results show " that the antisera for the paratyphosus A and enteritidis phages contain potent antibodies which neutralize the action of the typhosus-paratyphosus B fraction of the polyvalent enteritidis phage . . . ; both antisera also possess antibodies for the suipestifer fraction but to varying degrees of activity. Although the antiphage for paratyphosus B contains just as potent neutralizing antibodies as the other 2 antiphages, the former has no inhibiting action whatever on the same phage when suipestifer is used as the test organism ".—G. O. DAVIES.

PARASITOLOGY (ARTHROPODS IN RELATION TO DISEASE).

WHITEHEAD, F. E. (1935). **Damage to Livestock by Blood Sucking Midges.** [*Culicoides*].—*Rep. Okla. agric. Exp. Sta. 1932-34.* pp. 264-268. [Abst. from abst. in *Rev. appl. Ent.* **23.** 183-184].

In August, 1934, considerable damage was caused to domestic animals near Shawnee, Oklahoma, by *C. varipennis* Coq., which were breeding in a low and slowly flowing river into which sewage was dumped, on which the larvae fed. Infestation occurred as far as two miles from the river. Farmers were advised to put their stock into barns. When the current became swift again after the rains, there was less evidence of the sewage and when some oil from the Oklahoma City oil field happened to be washed into the river, the number of midges at once decreased.

KNOWLTON, G. F., & ROWE, J. A. (1935). **Handling Mosquitoes on Equine Encephalomyelitis Investigation.**—*J. econ. Ent.* **28.** 824-829. 8 figs. [4 refs.]

This paper describes methods evolved for collecting, storing and infecting mosquitoes for experiments on the transmission of equine encephalomyelitis. The mosquitoes, principally *Aedes* sp., were successfully fed on diseased guinea pigs, diseased horses and a mixture of glycerin brain emulsion and defibrinated horse blood. By the use of different methods it was possible to refeed 80 to 90 per cent. of the mosquitoes every third day for three or more refeedings.—J. MACLEOD.

TEN BROECK, C., & MERRILL, M. H. (1935). **Transmission of Equine Encephalomyelitis by Aedes aegypti.**—*Arch. Path.* **20.** 164.

This paper covers the ground of an article by the same authors already abstracted in this *Bull.* **6.** 420.

OLSON, C. (1935). **The Effect of Certain Ectoparasites on the Cellular Elements and Hemoglobin of the Blood of the Domestic Chicken.**—*J. Amer. vet. med. Ass.* **87.** 559-561. 1 table. [4 refs.]

Observations were made on two groups of five chickens, each of which was severely infested with lice (*Menopon stramineum*, *Gonioctes gigas*, *G. hologaster* and *Liperus variabilis*). One group was treated with nicotine sulphate and kept as controls free from lice.

Thrombocytosis and a moderate leucocytosis were observed in the infested group. No change in the haemoglobin referable to parasitism was observed.

It is concluded that severe infestations of chickens with lice are in all probability not associated with any marked anaemia.—J. S. STEWARD.

DOVE, W. E., & PARMAN, D. C. (1935). **Screw Worms in the Southeastern States.**—*J. econ. Ent.* **28.** 765-772. 4 figs.

Odd cases of infestation of animals by the larvae of *Chrysomyia* [*Cochliomyia*] *americana* have been recorded in the south-eastern states during the last 70 years.

In the summers of 1933 and 1934 the numbers increased rapidly to epizootic proportions ; about one and a half million cases occurred, of which 20 per cent. died. Sheep and goats, cattle, horses and mules, pigs and dogs were attacked, an average of about 12 per cent. of all animals being infested.

The authors review the life-history of the fly and describe the lesions produced. Untreated cases frequently result in death. Many of the infestations originated in tick-bite sores, in the navels of newly born animals and in operation wounds. Benzol and pine-tar oil are recommended for treatment, the oil acting as a repellent. Much harm was done by the desperate use of materials such as carbolic, creosotes, coal-tar and strong dips.—J. MacLeod.

Tate, H. D. (1935). **The Screw Worm** (*Cochliomyia americana* **C. & P.) Failed to Survive the Winter of 1934-35 in Iowa.** *J. econ. Ent.* **28.** 835 and 837.

An outbreak of infestation with *Chrysomyia* [*Cochliomyia*] *americana* occurred in north-west Iowa in 1934. The pest had not previously been recorded from such northern latitudes and experimental observation showed that larvae kept under various outdoor conditions failed to survive the winter of 1934 to 1935.
—J. MacLeod.

PARASITOLOGY (DISEASES CAUSED BY HELMINTH PARASITES).

Krijgsman, B. J. (1935). Enkele voor Nederlandsch-Indië nieuwe parasitaire wormen. [**New Parasitic Worms of the Dutch East Indies**].—*Ned.-ind. Bl. Diergeneesk.* **47.** 106-107. [English and German summaries : abst. from orig.]

The author gives the following supplementary list of the parasitic worms in mammals and birds of the Dutch East Indies :– water-buffalo – *Ascaris vitulorum* ; goat – *Stephanofilaria dedoesi* ; rat – *Euparyphium* sp., *Bertiella anapolytica*, *Mescocestoides* sp., *Hymenolepis diminuta*, plerocercoids of *Diphyllobothrium* sp., and *Protospirura muris* ; tapir – *Dictyocaulus* sp. ; dog – *Echinochasmus perfoliatus*, *Taenia hydatigena* and *Ascaris lumbricoides* ; cat – *Diphyllobothrium raillieti* and *Trichinella spiralis* ; fowl – *Strongyloides papillosus*, and pigeon – *Ascaridia columbae*.
—M. J. J. Houthuis (Rotterdam).

Plazikowski, U. (1935). Sugmaskar som orsak till enzootiskt uppträdande äggledareinflammation hos höns. [**Enzootic Salpingitis in Hens caused by** *Prosthogonimus pellucidus*].—*Skand. VetTidskr.* **25.** 731-749. 6 figs. [10 refs.] [English summary : abst. from orig.]

Hieronymi and Szidat [(1921). *Zlb. Bakt. I.* (*Orig.*). **86.** 236.] were the first to describe enzootic salpingitis in fowls caused by trematodes. Plazikowski gives a good historical survey and describes eight cases that occurred in Sweden. The symptoms were the laying of shell-less eggs, dulness, inappetence and diarrhoea. The course was acute. At autopsy a fibrinous purulent salpingitis and peritonitis caused by *P. pellucidus* was observed. The method of transmission is not known. Possibly an intermediate host, *e.g.* a snail, acts as transmitter.
—H. Berthelsen (Stockholm).

Burggraaf, H. (1935). Pancreas-distomatose. [**Fascioliasis of the Pancreas**]. —*Tijdschr. Diergeneesk.* **62.** 399-407 and 469-481. 4 tables. [5 refs.] [English, French and German summaries : abst. from orig.]

The author made an anatomical investigation on distomatosis of the pancreas,

caused by *Eurytrema pancreaticum*, in 90 carcasses from the abattoirs of Medan. The alterations of the pancreas were found in the ducts as well as in the gland-parenchyma. In 10 per cent. of the cases the gland parenchyma had nearly disappeared and was replaced by connective tissue and fat. The left lobe of the pancreas and some peripheral parts of the right lobe were found to be the most affected ; these parts were mostly shrivelled, with an irregular surface, and had knob-like areas of firm consistency. The colour was light with dark patches, calcified incrustations were found in the necrotic parts of the ducts and in the detritus there was a mass of parasites. In about 20 per cent. of cases distomatosis of the pancreas was frequently combined with lipomatosis.

The results are reported on investigations on the function of the affected pancreas by determining the strength of the trypsine and amylase. In cases with heavy pathological alterations, the quantities diminished until they disappeared with probably higher daily fluctuations and lower minimum values in blood sugar. An increase of the sugar-index in the blood was found only in cases with very heavy pathological alterations of the pancreas.—M. J. J. Houthuis (Rotterdam).

Pande, P. G. (1935). **The Etiology of Hump Sore in Cattle : A Preliminary Report.**—*Indian J. vet. Sci.* **5.** 332-342. 4 figs. on 2 plates, 2 tables. [3 refs.]

This is a preliminary report on certain investigations carried out in Assam, India, in regard to a peculiar skin disease of the hump region of cattle. In this province the condition is seen in plains cattle only, of which 90 per cent. show infection. The author succeeded in isolating microfilariae and adult worms from lesions in all cases examined and considers these nematodes to be responsible for the condition. Their identity was not determined. A good description of lesions is included.—C. Davenport.

IMMUNITY.

Velu, H., & Zottner, G. (1935). *Brucella abortus* en excipient irrésorbable et phénomene de zone. **[The Inoculation of *Br. abortus* in a Fatty Medium and the Occurrence of a Zone Phenomenon].**—*C. R. Soc. Biol. Paris.* **119.** 476-478. [2 refs.]

The authors found that, in addition to improving the production of brucella agglutinins, the use of a fatty excipient also increased the frequency of the zone phenomenon (negative phases of agglutination). This applied to the sera of horses, cattle, sheep, rabbits and guinea pigs, no matter whether the *Br. abortus* suspensions were living or dead. The phenomenon was observed in 66 per cent. of bovine sera produced in this way.—Gwilym O. Davies.

Velu, H., & Zottner, G. (1935). Les excipients gras et la vaccination anti-brucellique. **[Brucella Antigens in Fatty Bases].**—*Rev. Microbiol., Paris.* **1.** 453-456. 1 table. [5 refs.]

An investigation to determine whether it is possible with *Brucella abortus* infection, as in the case of tuberculosis, Johne's disease and diphtheria, to immunize or premunize an animal by means of a vaccine in a fatty base.

Experiments with rabbits showed that an oily excipient did not interfere with the production of antibodies. A vaccine containing living organisms gave more regular results than a vaccine containing killed organisms, and when either of these was embodied in a fatty base the immunity was more durable than in the case of living or dead organisms suspended in serum.

Accordingly, a vaccine consisting of dead *Br. abortus* incorporated in a fatty excipient was tried on horses and mules, and the authors concluded that this method of vaccination was very promising. They also noted the marked sensitivity of equines to *Br. abortus* as shown by the local, thermal and general reactions provoked by the dead vaccine.—GWILYM O. DAVIES.

STARR, L. E., & SNIDER, G. E. (1934). **Serologic Relationship of Brucella and Pasteurella.**—*J. infect. Dis.* **55.** 384-389. [6 refs.]

The authors carried out cross-agglutination tests with brucella and pasteurella antigens on 96 samples of cattle sera. Low titre sera agglutinated both antigens equally well. Strongly positive sera showed higher end-titres with brucella than with pasteurella. [See also this *Bull.* **5.** 85 and 193].—T. M. DOYLE.

DACHENA, G. (1934). Agglutinazione reciproca dei tipi dei generi pasteurella e brucella. [**Cross-Agglutination between** *Pasteurella* **and** *Brucella*].—*Studi sassaresi.* **11.** [Abst. from reprint : pp. 8.] [8 refs.]

It has been shown that cross-agglutination occurs between *Past. tularensis* and *Br. abortus*, and the author wished to study further the cross-agglutinating properties of brucella. In one series of experiments, rabbits were immunized with *Br. abortus*, *Br. melitensis* and bovine, porcine and avian strains of pasteurella. Agglutination tests showed that in no case did anti-brucella serum agglutinate the pasteurella at a titre higher than 1 : 50. It was impossible to obtain a pasteurella serum with a titre higher than 1 : 50 ; this, however, only agglutinated brucella at 1 : 10. It was also shown that serum from cattle suffering from haemorrhagic septicaemia agglutinated *Br. abortus* up to 1 : 150 while such serum did not agglutinate any of the pasteurella above 1 : 40. Bovine serum possessing a high agglutinating titre against *Br. abortus* did not agglutinate pasteurella at a higher titre than 1 : 40.—J. A. NICHOLSON.

MADSEN, T., & HOLM, J. (1935). **Tuberculin Standardisation and Tuberculin Tests.**—*Quart. Bull. Hlth Org. L.o.N.* **4.** 475-481. 4 figs. [1 ref.]

In view of the divergences which have been reported in the past, the authors advocate the adoption of a standard tuberculin and a standardized test for man. The present position regarding standard tuberculin is considered satisfactory, but further enquiries into synthetic medium tuberculin (heat concentrated) and purified tuberculin protein are desirable. The relative value of the intracutaneous and cutaneous tests in man is discussed. It is concluded that, for mass investigations, the only satisfactory method is the use of graded intradermal doses commencing with 0·01 mg. and ending with 1 mg.—R. E. GLOVER.

FINZI, G. (1935). L' " esotubercolina " (E.T.F.). [**Finzi's Exotuberculin (E.T.F.)**].—*Profilassi.* **8.** 66-77 and 148-159. [Numerous refs.]

It was found that 0·5 c.c. of exotuberculin given subcutaneously produced a general reaction in tuberculous animals, but doses of 2·5 c.c. were considered more suitable for general use. Following such a dose, a rise in temperature occurs within 2 to 10 hours and reaches its maximum in 12 to 18 hours. Doses of 10 c.c. produce no general reaction in non-tuberculous animals.

The original experiments were carried out with exotuberculin prepared from the human type of bacillus ; it was found, however, that the bovine type produced an equally active exotuberculin. It has now become the practice to issue exotuberculin containing equal parts of the products of growth of human and bovine bacilli. An avian exotuberculin has also been prepared in a similar manner.

Subcutaneous tests on guinea pigs infected experimentally with tuberculosis have shown that exotuberculin produces a steadier and higher rise of temperature than old tuberculin, while it is at least as potent as old tuberculin for the intradermal test, 0·1 c.c. of a 1 : 1,000 dilution producing a typical reaction.

In the field, the author recommends that exotuberculin be given subcutaneously or intramuscularly in doses of 2·5 c.c. In both cases, the reaction produced is said to be much clearer than that seen when old tuberculin is used. The author considers that the ophthalmic test is very reliable provided that a second dose is given 24 hours after the first. For the intradermal test 0·25 c.c. should be used. Avian exotuberculin appears to be more toxic to healthy birds than old tuberculin, but it produces a clearer reaction in birds affected with tuberculosis.

In conclusion, it is claimed that exotuberculin is easier and cheaper to prepare than old tuberculin and, in addition, smaller doses are required and better reactions are obtained than with any other agent used for the diagnosis of tuberculosis. [For an earlier paper, see this *Bull.* **5.** 255].—J. A. Nicholson.

Valle, A. L. (1934). Ensaio de tuberculinisação intensiva no estado do Rio. [**Intensive Tuberculin Testing in the State of Rio**].—*Rev. Dep. nac. Prod. anim.* **1.** Nos. 5-6. 105-107. 1 table.

The intradermal tuberculin test was applied to 483 cows, 20 bulls and 39 calves, the single inoculation, caudal fold technique being employed. Of the cows, 0·41 per cent. and of the calves, 5·1 per cent. gave positive reactions, but none of the bulls reacted. The testing was part of a campaign to subject all bovines in the state to the test.—R. S. Roberts.

Favorite, G. O., & Culp, C. F. (1935). **The Intradermal Test in Undulant Fever. Reactions in Healthy and Infected Individuals.**—*J. Lab. clin. Med.* **20.** 522-526. [20 refs.]

An intradermal test gave promising results when applied to a few human cases of undulant fever and to a number of healthy controls.—J. E.

Saenz, A. (1935). Accroissement de l'état allergique et titrage de la sensibilité tuberculinique conférés au cobaye par l'inoculation sous-cutanée de bacilles tuberculeux morts enrobés dans de l'huile de vaseline. [**The Allergic Response of Guinea Pigs Inoculated Subcutaneously with Dead Tubercle Bacilli in Vaseline**].—*C. R. Soc. Biol. Paris.* **120.** 1050-1053. [7 refs.]

Guinea pigs sensitized with amounts of dead tubercle bacilli varying from 1 to 10 mg., suspended in vaseline, became allergic to tuberculin. Six days after inoculation, reactions of an oedematous type were induced by a 1 : 10 dilution of " O.T.", while by the 20th day they were haemorrhagic and necrotic. After the 70th day, the animals were utilizable for the comparative titration of tuberculins, since diffuse haemorrhagic lesions, with necrotic centres, were produced with dilutions of " O.T." up to 1 : 10,000 [presumably one-tenth of a 1 : 1,000 dilution]. According to the author, the allergic response of these guinea pigs was twice as strong as that induced in animals injected with saline suspensions of living, virulent organisms.—R. E. Glover.

Malis, G. (1935). Rôle du système nerveux central dans les réactions allergiques de la peau. [**The Nervous System in its Relation to Dermal Allergic Reactions**].—*C. R. Soc. Biol. Paris.* **120.** 1220-1221. [3 refs.]

These experiments are based on the theory of immunological reactions associated with conditional reflexes, which has been developed by Metalnikov

[this *Bull.* **4.** 558]. Tuberculous rabbits were divided into two groups. One batch received an intradermal injection of tuberculin every 48 hours and gave typical reactions, while the control batch received sodium chloride solution, with negative results. At each inoculation, the animals were excited by inhalations of ammonia. After 26 injections, the first group received normal saline solution instead of tuberculin. Specific reactions were observed and were still produced up to the 53rd day, when the animals were killed.—R. E. GLOVER.

—. (1935). **Bacterial Allergy.**—*Lancet.* **229.** 1250. [3 refs.]

In this annotation it is claimed, firstly, that more work is necessary to determine to what extent positive reactions to bacterial vaccines occur in persons displaying no allergic phenomena and, secondly, that where such reactions are positively correlated, it is important to ascertain which part of the complex mixture of antigens in the bacterium is responsible.—F. BLAKEMORE.

GOLOWANOVA, A. J. (1935). Die praktische Verwendung der Fällungsreaktion nach Meinicke bei infektiösem Abortus der Rinder und Rotz der Pferde. **[The Use of Meinicke's Clearing Reaction in Bovine Contagious Abortion and Glanders].**—*Tierärztl. Rdsch.* **41.** 759-761. 2 tables. [8 refs.]

The author states that clearing reactions are of great importance as complimentary tests to the original complement-fixation test, although they are not reliable independent tests. He reports that the technique is simple and that no ingredients are necessary such as those required by the complement-fixation test.

Although clearing reactions have not been used frequently in veterinary practice, papers have recently been published dealing with their application to the diagnosis of contagious abortion in cows and glanders in horses.

The technique and results of the examination of the sera of 900 cows for contagious abortion and of 450 horses for glanders by means of the complement-fixation test and the Meinicke clearing tests are described. The author believes that clearing tests, particularly the Meinicke test, are most suitable for the diagnosis of contagious abortion in cattle and of glanders in horses.—K. D. DOWNHAM.

APITZ, K. (1935). **Studies on the Chemical Nature of Shwartzman-Active Substances.**—*J. Immunol.* **29.** 343-358. 4 tables. [26 refs.]

A number of experiments were undertaken in an endeavour to prepare pure, stable, activating substances of the Shwartzman type. Freshly prepared filtrates from agar washings of *Salmonella typhi*, *meningococcus* and *S. paratyphosi* B were precipitated with alcohol. The sediment was redissolved and precipitated with 20 per cent. acetic acid. The process was repeated until no further precipitates were formed.

It was found that the alcohol filtrate was inactive, but that Shwartzman-active fractions were contained in the acid precipitate and in the final filtrate. The activity of the former was probably due to dissolved nucleo-proteins obtained from the bacterial bodies. The final filtrate, which was equally active, was biuret-negative and gave a distinct Molisch test. It was shown to differ, however, from the type-specific carbohydrates. The marked lability of these products made further purification impossible.—R. E. GLOVER.

OGATA, T. (1936). **Inhibition of the Shwartzman Phenomenon.**—*J. exp. Med.* **63.** 59-68. 3 tables. [10 refs.]

These experiments were undertaken with *Salmonella typhi* and *meningococcus* filtrates. Rabbits inoculated intradermally with graded doses of the filtrate under

test, and receiving an intravenous injection of the same product 24 hours later, gave the Shwartzman phenomenon. If, however, a preliminary intravenous injection was made shortly before or after the skin-preparatory injection, the reaction was completely inhibited. The amounts required varied from 1 : 160 to 1 : 400. The inhibiting effect was also produced non-specifically by heterologous filtrates capable of eliciting the Shwartzman phenomenon, but not by agents lacking in reactivity potency (*Streptococcus haemolyticus* filtrates, broth, etc.).
—R. E. Glover.

Ramon, G., Richou, R., & Descazeaux, J. (1935). Sur la présence d'antitoxine staphylococcique d'origine naturelle chez l'homme et chez différentes espèces animales. [**The Presence of Natural Staphylococcus Antitoxin in Man and Animals**].—*C. R. Soc. Biol. Paris.* **119.** 1070-1072. [10 refs.]

This is an abbreviated version of another article – see this *Bull.* **6.** 252.
—F. H. Manley.

Thibault, P., & Richou, R. (1936). Sur l'accroissement de l'immunité antitoxique sous l'influence de l'addition de diverses substances à l'antigène (anatoxines diphtérique et tétanique). [**Increase of Antitoxic Immunity under the Influence of Various Substances added to the Antigen (Diphtheria and Tetanus Anatoxins)**].—*C. R. Soc. Biol. Paris.* **121.** 718-721. [5 refs.]

The antitoxic immunity provoked in guinea pigs and rabbits by diphtheria or tetanus anatoxin is considerably increased by the incorporation of the antigen in a mixture of lanolin and oil or by injecting along with it a substance such as saponin which provokes an acute local inflammation.—Gwilym O. Davies.

Ramon, G., Richou, R., Nicol, L., & Lupu, A. (1936). Étude comparée de diverses immunités antitoxiques (antidiphtérique, antistaphylococcique, anti-Preisz-Nocard, etc.), d'origine naturelle, chez le cheval. [**Natural Antitoxic Immunity of the Horse towards Various Bacteria** – *Corynebact. diphtheriae*, *C. pseudotuberculosis*, **Staphylococci**].—*C. R. Soc. Biol. Paris.* **121.** 521-524. [4 refs.]

The sera of 24 normal horses were examined for the presence of various antitoxins. In most cases, comparatively large amounts of antitoxins were present for *C. diphtheriae* and staphylococci. Antitoxin for *C. pseudotuberculosis* was less frequently encountered. Antitoxin for snake venoms and abrin was never found. The conclusion is that antitoxin production depends on the presence of the specific antigen in the animal body.—N. J. Scorgie.

Picado, C. (1936). Synergie d'anticorps par " déviation hiérarchique ". [**Synergy of (Production of Heterologous) Antibodies**].—*Ann. Inst. Pasteur.* **56.** 186-205. 1 table, 8 graphs. [14 refs.]

This paper describes a series of experiments designed to determine the changes which take place in the antibody content of sera by the injection of a totally different antigen.

Both the agglutinins and haemolysins induced in rabbits by a single injection of antigen can be reinforced by the injection of a heterologous antigen which under these circumstances does not produce specific antibodies but, by a " deviation " of its action, temporarily increases the existing antibodies. Similarly, if the rabbit is primarily immunized with two antigens, a further injection with another antigen stimulates the production of antibodies already present against one of the previous antigens.

The author has also shown that the *in vitro* mixing of two immune sera leads after a varying interval to a " deviation " resulting in an increase of the antitoxic power of one of the sera. He also shows that the *in vitro* addition of normal serum to immune serum raises the antibody content of the latter.—GWILYM O. DAVIES.

HEIDELBERGER, M. (1935). **Immunochemistry.**—*Ann. Rev. Biochem.* **4.** 569-592. [Numerous refs.]

The author has divided his review into the following sections :–

NATURALLY-OCCURRING ANTIGENS.—In the salmonella group it was found that for *Proteus vulgaris* the " O " or heat-stable complex contains an alkali-labile factor responsible for the " O " agglutination in homologous antiserum and an alkali-stable factor responsible for the cross-reaction with typhus serum. By extraction of *Salmonella typhi-murium* with 0·25N trichloracetic acid in the cold, an antigenic complex has been obtained which is split by boiling acetic acid into a non-antigenic specfic polysaccharide and a phosphatide, the latter yielding a crystalline fatty acid on further degradation. A small amount of a water-soluble albumin (which disappeared rapidly if enzyme action was not avoided) was obtained from strains of the brucella group and also a water-soluble nucleo-protein which split off nucleic acid when treated with alkali. It has been shown that nucleic acid could be removed from purified tuberculin by ammonium sulphate fractionation without impairing its activity. No marked differences in the composition of ammonium sulphate purified tuberculin from human, bovine, avian or timothy strains were found.

CHEMICALLY-ALTERED PROTEINS AND ANTIGENS.—The distinction between haptens and antigens is no longer absolute, but hapten is so convenient a term for the portion of an antigen determining a particular specificity that it will still be used.

ANTIBODIES AND COMPLEMENT.—Studies on the purification of antibodies again point to their protein nature. It has been found by work on antibody formation to a red dye that as little as 0·55 mg. of the antigen given in a series of minute doses may stimulate the production of more than 200 times its weight of precipitin.

THE CHEMISTRY OF IMMUNE REACTIONS.—An interesting development in virus diseases was the discovery that the serum of monkeys acutely ill with yellow fever contained a precipitinogen in the albumin fraction which was entirely independent of the virus and was possibly formed by the action of the virus on the body proteins. This substance induced precipitin formation in the sera of recovered cases in man and monkeys.—JAMES STEWART.

FOX, C. A., & WHITEHEAD, R. W. (1936). **Relation of the Adrenal Glands to Immunological Processes. Effect of Cortico-Adrenal Extract on Hemolysin Production in Normal Adult Laboratory Animals.**—*J. Immunol.* **30.** 51-62. 2 tables, 5 charts. [Numerous refs.]

It is evident from physiological and morphological studies that the adrenal cortex is in some way associated with the formation of antibodies. The purpose of this study was to determine the effect of an extract of the lipoid fraction of the adrenal cortex on the ability of normal animals to form haemolysin. In normal rats sensitized with a single injection of sheep red blood cells, it was found that those receiving cortico-adrenal extract showed an average increase of 40 to 70 per cent. in the haemolysin titre over untreated controls. The prolonged administration of cortico-adrenal extract to rabbits, immunized with repeated injections of large doses of sheep red cells, resulted in an increased rate of haemolysin production especially marked during the early stages of the immunization process.—A. R.

TORRANCE, C. C. (1936). **Further Studies on the Relation between Vitamin-A Metabolism and Susceptibility to Bacterial Toxins.**—*Amer. J. Hyg.* **23.** 74-79. 3 tables. [6 refs.]

The author has not been able to demonstrate that any relationship exists between the store of vitamin A in the livers of guinea pigs and their susceptibility to bacterial toxins, nor has he been able to show that the injection of tetanus toxin made any appreciable difference in the rate of utilization of vitamin A content in the liver. It was noted, however, that the period of the year during which difficulties were experienced in the standardization of toxin coincided with the time when the vitamin A content of the liver was at its lowest.

Since these experiments, others have suggested that vitamin C is a factor in the susceptibility to bacterial toxins, and the author proposed to investigate this aspect in the future.—GWILYM O. DAVIES.

DISEASES, GENERAL.

—. (1935). **The Control of Communicable Diseases. Report of a Committee of the American Public Health Association.**—*Publ. Hlth Rep., Wash.* **50.** 1017-1077.

This report will only be of interest to those engaged in public health work. While certain diseases of animals receive mention, they are considered entirely in their relationship to human health.

The object of the report is the provision of data for the use of public health officials in formulating regulations for the control of communicable diseases of man. Sixty-two conditions are considered. Of these, ten only have a direct animal connexion, *viz.* actinomycosis, anthrax, glanders, psittacosis, rabies, trichinosis, tuberculosis (other than pulmonary), tularaemia, brucella infection and, less directly, botulism.

Each disease is dealt with on similar lines, the information supplied being given under the following headings as far as applicable :– description of the disease, clinical and laboratory recognition, aetiological agent, source of infection, mode of transmission, incubation period, period of communicability, susceptibility, immunity and prevalence. Following this are offered methods of control. In most of the cases in which an animal origin for the disease exists, a brief note is included showing the symptoms exhibited by affected animals and the measures of control to be adopted for safeguarding the human subject.

The chief value of the article to veterinary workers lies in the standardization of description and methods and in a set of definitions of terms commonly used in connexion with the sanitary control of epidemics.—C. DAVENPORT.

—. (1935). **Statistical Tables and Maps showing Progress of Tuberculosis and Bang's Disease Work among Livestock in the United States.**—*U.S. Dep. Agric. Tuberculosis Erad. Div.* pp. 15. 17 tables, 3 maps. [Mimeographed] [fcp].

This is a collection of statistics and illustrations concerning the extensive campaign against tuberculosis and dealing with the period 1917 to 1935. With a few exceptions any comments are left to the reader.

During this period more than one and a half hundred million cattle were tested, 3,302,561 reacting. Numbers are given for each state for each year. During these years modified accredited herds (with less than 0·5 per cent. reactors) increased from 204 to 238,937. In 1922, 17 counties in four states were designated modified

accredited areas ; this number had increased to 2,709 by 1935. The percentage of infection, as might be expected, fell steadily during this time from 4 to 0·5.

With regard to swine, the number of carcasses condemned as unfit for food dropped from a maximum of over 100,000 in 1924 to 26,133, or 0·08 per cent. of the total slaughtered, in 1935.

In any eradication scheme where extensive use is made of the tuberculin test, poultry cannot be ignored and it is interesting to note that records are available since 1925. From these it can be seen that 4·8 per cent., or a total of 98,266 head approximately, have been affected.

On the last two pages of this report are to be found a map and a table illustrating the distribution of Bang's disease, which shows that over three million female animals are under supervision. The large number of animals waiting to be included indicated the popularity of the scheme.—N. S. Barron.

Coronel, A. B. (1935). **A Résumé of the Outbreak of Swine Diseases in the Bureau of Prisons' Hog Farm in 1933-1934.**—*Philipp. J. anim. Indust.* **2.** 327-332.

This paper reports the outbreak of swine diseases in the pig-farm of the Bureau of Prisons in 1933 to 1934. The herd, which was established in 1931, at first prospered, but disease problems were soon encountered and during the two years concerned the following conditions were diagnosed :– contagious abortion, swine fever and swine plague, scours of sucking pigs, mastitis, septic metritis, wound infection, parasitic diseases and enteritis.

The author advises the treatment of simple mastitis. He discusses immunization against swine fever and states that it should not be adopted in a clean herd unless there is an outbreak in the neighbourhood. If disease exists in a herd and one or two lots only are affected, the pigs involved should be treated with serum alone and the remaining animals injected with serum and virus simultaneously ; after a lapse of seven to ten days the immunization should be repeated in the infected lots by the latter method.

A more practical method consists in the simultaneous immunization of all pigs on the infected farm if the general condition warrants, except pregnant sows and sucking pigs under two months of age.—J. M. L. Penhale.

Handa, B. N. (1935). **Some Important Diseases of Sheep in the Low-Land, Inundated, and Water-Logged Areas of the Punjab, with a Particular Reference to the Control Measures at the Government Cattle Farm, Hissar.** —*Vet. Bull. civ. vet. Dep. Punjab.* No. 3. pp. 12. 5 figs. on 3 plates. [7 refs.]

The following diseases of sheep found at the Government Cattle Farm, Hissar, are reviewed :– liver rot, parasitic gastritis due to *Haemonchus contortus*, pulmonary and bronchial strongylosis, and nostril fly and blowfly infestation. A description of the respective life-histories of the parasites is given, together with the symptoms of the diseases and the treatment to be adopted. Local conditions are explained and suitable measures of control recommended.—G. K. Walker.

I. Williams, W. L. (1935). **Diseases of Young Animals.**—*12th Int. vet. Congr. 1934.* **2.** 441-456. 2 tables, 1 chart. [French, German and Spanish summaries].

II. Miessner, H., & Köser, A. (1935). Aufzuchtkrankheiten. **[Breeding Diseases and Diseases of the New-Born].**—*Ibid.* 457-479. [Numerous refs.] [English, French and Spanish summaries : abst. from orig. in German].

III. SIGMUND, J. (1935). Aufzuchtkrankheiten. [**Breeding Diseases and Diseases of the New-Born**].—*Ibid.* 480-492. [English, French and Spanish summaries : abst. from orig. in German].

IV. —. (1935). **Discussion of Papers on Diseases of Young Animals.**—*Ibid.* 493.

I. An abstract of this article, published elsewhere, has already appeared in this *Bull.* **5.** 366.

II. The history of the founding of the German organization for the control of diseases of breeding animals (Reichszentrale für die Bekämpfung der Aufzuchtkrankheiten) is given. While each province has its own veterinary investigation laboratory which regulates the local diagnostic, research and control work, the central office at the Hygiene Institute of Hanover Veterinary College receives reports from the provincial institutes and issues biennial reports showing the state of affairs throughout the country as a whole. The main part of the article gives a view of the present state of knowledge on this wide subject. [The reader is referred to an abstract of the 9th and 10th reports of the Reichszentrale, this *Bull.* **5.** 172].

III. Sigmund gives a general dissertation on the various causal factors affecting diseases of breeding animals and deals specially with the treatment of scours in foals and calves.

IV. In the discussion GÖTZE briefly described the four common diseases of new-born calves in Germany : these are *Bact. coli* infection, paratyphoid infection, pneumonia caused by pasteurella and broncho-pneumonia caused by *Corynebact. pyogenes.*—J. E.

INNES, J. R. M. (1936). **" Swayback " : A Congenital Demyelinating Disease of Lambs with Affinities to Schilder's Encephalitis.**—*Proc. R. Soc. Med.* **29.** 406-409. [8 refs.]

This disease, which is also known as " swingback ", is stated to be wide-spread throughout England and Wales at the present time. The morbidity rate in affected flocks varies between 10 and 50 per cent.

The author describes the symptoms, *post-mortem* findings and histological changes found in 33 lambs affected with the disease.

The nervous symptoms are progressive and are often accompanied by blindness. The only lesions are found in the central nervous system, and these are not detectable with the unaided eye in more than 50 per cent. of the cases.

Histologically, the lesions consist in a symmetrical demyelination commencing in the occipital lobes and similar in many respects to Schilder's disease.

The aetiology of the disease is not known and attempts to transmit it to healthy animals were unsuccessful. Certain features of the disease suggest a similarity to congenital plumbism, but this aspect of the problem awaits investigation.—E. G. W.

HINDMARSH, W. L. (1935). **Posterior Paralysis of Pigs due to Spinal Lesions.**—*Aust. vet. J.* **11.** 149-150.

The author carried out a *post-mortem* examination on two pigs which showed motor paralysis of the hind quarters and found that fracture of the third lumbar vertebra was the cause of paralysis. The lesions were compression fractures with haemorrhage and actual pressure on the spinal cords. The pigs had been fed a diet which was definitely deficient in lime and lacked vitamins. Another similar case has been reported in the field.

In another pig, posterior paralysis was found to be due to a bacterial infection of the third lumbar vertebra.—W. I. B. BEVERIDGE.

MIKKELSEN, A. (1935). Et tilfaelde af rygmarvstyfus. [**Infectious Paraplegia in the Horse**].—*Medlemsbl. danske Dyrlaegeforen.* **18.** 462-468.

A farm horse suddenly became affected with paraplegia in June and died 50 days later. Five other adult horses showed the same symptoms 49, 51, 53, 59 and 61 days respectively after the date when the first horse became ill, but the course of the disease was much more acute and they died after a few days. The only horses that survived on the farm were two colts which were grazing in an isolated field.

[Infectious paraplegia was first described by STOCKFLETH – (1855). *Tidsskr. Vet.* **3.** 55. – from different stocks of horses in Denmark, and later – (1859). *Ibid.* **7.** 237, and (1870). *Ibid.* **18.** 64. In most cases there are precursory symptoms – a couple of days before the serious stage is evident – indolence, and undue sweating during work. These symptoms are, however, frequently overlooked by the attendant, the animal being found lying in the stable unable to get up and with all the symptoms of paraplegia. Pulse and temperature are about normal. The cerebration seems to be unimpaired ; there are no urinary changes. If the horse is given food, it takes it if its head is supported. Death frequently occurs in the course of 12 to 36 hours, but illness may be protracted for several weeks. The mortality is high and, not infrequently, the whole of the animals in a stable die. If the affected horses can be made to stand, recovery sometimes occurs, but generally after a very long time (several months). Muscular atrophy occurs occasionally. *Post-mortem* examination does not reveal any characteristic alterations.

In reality, no more is known now about the cause than at the time when STOCKFLETH first described the disease. It is mostly confined to certain localities, although even in such areas there may be freedom from cases for years. The diagnosis of isolated cases is very difficult as the *post-mortem* findings are not characteristic. Intoxications may be confused with the disease, and also myohaemoglobinuria paralytica (azoturia), but in this case the differential diagnosis is easy (urinary changes).

In many cases a simultaneous occurrence has been observed of paraplegia among the horses of a farm and of bulbar paralysis (in German, " enzootische Schlundkopflähmung ", " Wasenmeisterkrankheit ") among the cattle. Such cases were described by KRISTENSEN – (1911-1912). *Maanedsskr. Dyrlaeg.* **23.** 545-568. – who does not consider it unreasonable to suppose that the disease is due to an intoxication with an unknown substance, although he does not reject the infection theory. B. BANG tried to reproduce the disease in horses with fodder from farms devastated by the disease, and also by feeding horses with organs of dead horses, but was unsuccessful. JENSEN could not find the streptococci in Danish cases described by SCHLEGEL.

Although the cause is obscure, both this disease and the enzootic paralysis of the fauces in cattle are, owing to their peculiar occurrence, still one of the group of diseases subject to public treatment under the Infectious Diseases in Domestic Animals Act of April 20th, 1920 (Denmark). During the years 1891 to 1925 the diagnosis of enzootic paraplegia was made on an average in 21 stables annually.

The disease is referred to by DIECKERHOFF – (1892). *Lehrbuch d. speciellen Pathol. u. Therapie für Thierärzte.* Vol. 1. (2nd Edit.) 311-313. " Endemische Rückenmarkslähmung. Paraplegia infectiosa," by THOMASSEN – (1893). *Ann. Méd. vét.* **42.** 306-312, and by ZWICK – (1922). *Lehrbuch d. speciellen Pathol. u. Therapie d. Haustiere.* Vol. 1. 673].—H. C. BENDIXEN (COPENHAGEN).

I. SCHECKER, H. (1934). Ueber die Veränderungen der Regio cingularis und der Regio retrosplenialis des Pferdes bei der Hydrocephalia chronica interna acquisita. [**Regional Changes in the Brain of the Horse in Hydrocephala Chronica Interna Acquisita**].—*Inaug. Diss., Berlin.* pp. 21. 1 fig., 1 table. [11 refs.]

II. HASSE-WRANAU, H. (1934). Ueber die Veränderungen des Stirnhirnes, der Centralregionen und der Insel des Pferdes bei der Hydrocephalia chronica interna acquisita. [**Regional Changes in the Brain of the Horse in Hydrocephala Chronica Interna Acquisita**].—*Ibid.* pp. 28. 7 figs., 1 table. [10 refs.]

I. The cellular architecture of the cerebral cortex is described and the changes found in cases of chronic acquired internal hydrocephalus are discussed.

The medial surface of the cerebral hemispheres is only slightly affected, the most marked changes taking place in the lamina zonalis of the regio retrosplenialis, where the atrophy may be as much as 37 per cent. of the total cortex.

Measurements of the thickness of the different cell layers of the cortex are given in the form of tables, the values for three cases of hydrocephalus being compared with those considered to be normal.

II. The material used for the observations which are recorded in this paper was the same as that made use of by SCHECKER, and the order of presentation is similar in both theses.

Atrophy was found to be present in some areas of the cortex ; in others there was an actual thickening. The latter condition results from a lateral displacement of the cortex due to pressure.—E. G. WHITE.

BOLLE, W. (1936). Beitrag zur vergleichenden Pathologie der Leber. Eine experimentelle Studie zur Entstehung der toxischen Leberdystrophie. [**Pathology of the Liver. Production of Toxic Dystrophy of the Liver**].—*Arch. wiss. prakt. Tierheilk.* **70.** 99-121. 6 figs., 3 tables. [Numerous refs.]

A discussion of the various factors which have been accused of causing toxic liver dystrophy in man and in animals is followed by a detailed account of the lesions produced in young pigs by one of them – spoiled cod liver oil. This substance has caused some hundreds of deaths in swine in Mecklenburg during the last decade. The term " Lebertranleber " is considered suitable to describe the characteristic appearance of this organ in pigs following cod liver oil poisoning.

The administration of small doses of such oil twice daily to four young pigs, fed on a diet of 150 g. of oat and barley meal and 10 g. of meat meal night and morning, was successful in reproducing the conditions. Two pigs from the same litter were used as controls. All the animals were immunized against swine fever and erysipelas and freed from worms before the commencement of the experiment.

The first symptoms appeared after two weeks and at the end of five weeks three of the animals given oil had died ; the fourth was killed on the 39th day. The control animals showed no symptoms.

Histological examination presented evidence of a severe disturbance of calcium and fat metabolism as shown by dystrophic calcification in the liver cells.

Examination before death revealed a condition of hypercholeresterinaemia, formation of unsaturated fatty acids and fat and calcium soaps and, in addition, the presence in the liver of a strongly haemolytic substance.

The mechanism by which cod liver oil acts is not clear.—E. G. WHITE.

WESTER, J. (1935). Chronische nierontstekingen bij het rund. [**Chronic Nephritis in Cattle**].—*Tijdschr. Diergeneesk.* **62.** 62-67 and 128-140. [English, French and German summaries : abst. from orig.]

The author discusses the following different forms of chronic inflammation of the kidney occurring in bovines :–

(1) Chronic embolic nephritis. The kidneys are enlarged, particoloured and show infarcts : acute embolic nephritis is caused by circulating bacteria.

(2) Chronic glomerulo-nephritis (nephritis fibrocystica). This seems to be caused by bacterial toxins and is always bilateral. The kidneys may weigh 3,250 g. each.

(3) Primary diffuse interstitial nephritis (genuine atrophied kidney). Both kidneys are very small and hard : the interstitial tissue is increased.

(4) Secondary atrophied kidney, unilateral, with compensatory hypertrophy of the other side.

(5) Tuberculosis of the kidney. The author considers that this can be diagnosed if *Mycobact. tuberculosis* is found in the catheter urine.

(6) Pyelonephritis of the cow. This is in the form of a cysto-uretro-pyelonephritis.

The process has an ascending form, developing from a cystitis, especially after parturitions, and is caused by *Corynebact. renale.*

There is also another type of primary haematogenous inflammation of the kidney, in which a pyelitis, ureteritis and cystitis may arise secondarily. It is also possible for a kidney to be simultaneously affected by a haematogenous and an ascending pyelonephritis.—M. J. J. Houthuis (Rotterdam).

de Camp, C. E. (1936). **A Consideration of Urinary Calculi in Animals.**—*J. Amer. vet. med. Ass.* **88.** 66-73. [7 refs.]

In this paper the author gives a brief survey of the factors bearing on the formation of urinary calculi, the symptoms caused by them and the methods of treatment available. Much of the information quoted is from the field of human medicine. No original work is reported.—A. Robertson.

Thormählen, A. (1935). Beiträge zur Kenntnis des Blutbildes und der Blutzusammensetzung bei der Rinderleukose unter besonderer Berücksichtigung des normalen Blutbildes beim Rinde. [**Blood Picture and Composition in Leucosis of Cattle**].—*Inaug. Diss., Berlin.* pp. 31. 7 tables, 1 chart. [Numerous refs.]

The blood cell count for normal bovines is given as follows :– erythrocytes – about 6 million, leucocytes – 8,200, thrombocytes – 700,000 per c.mm. The differential leucocyte count is :– lymphocytes – 50 per cent., neutrophiles – 30 to 40 per cent., eosinophiles – 10 per cent., basophiles – 1 per cent., and monocytes – 7 per cent. Anaemic types of change are absent in the normal subject.

Normal physiological changes such as oestrum do not alter the blood picture but, in herds infected with leucosis, 40 to 50 per cent. of the animals show abnormalities, associated with an increase of lymphocytes or lymphoidocytes (parent cells). Changes in the physical characters of the blood are of no diagnostic significance.—E. J. Pullinger.

Castle, W. B. (1935). **The Etiology of Pernicious and Related Macrocytic Anemias.**—*Science.* **82.** 159-164. [Numerous refs.]

In this article the view is advanced that certain macrocytic anaemias are caused by changes in the alimentary tract which interfere with the digestion or assimilation of food. It is pointed out that deficiency of the active principle which prevents the development of pernicious anaemia may be brought about in at least three ways, namely, lack of intrinsic factor in the gastric juice, lack of extrinsic

factor in the food, or failure of the absorption or the destruction of these substances or their end product in the intestinal tract.

Attention is drawn to the work of McCarrison, who, by dietary deficiency, produced pathological changes in the alimentary canal, and to the recent work by Miller and Rhoads [(1935). *J. clin. Invest.* **14.** 153.] who, by the use of diets presumably deficient in vitamin B_2, produced a condition in swine in which the intrinsic factor disappeared from the gastric juice, the animals showing stomatitis, gastric anacidity and macrocytic anaemia.—W. J. Ironside.

László, F. (1935). Ueber die Schildbildung der Eber. [**Scleroderma in Boars**]. —*Dtsch. tierärztl. Wschr.* **43.** 790.

The author describes a condition which is common in aged boars and in pigs castrated late in life. It consists of a hardening of the skin in the region of the shoulder, resulting in the formation of a plaque about 5 cm. in thickness, so hard as to be almost impossible to cut with a knife. The bristles covering the affected area are usually normal.

The author does not agree with those who have considered this " Schildbildung " as pathological and have termed it scleroderma. Histologically, the condition is a physiological hypertrophy of the connective tissue of the corium, unaccompanied by the vascular changes which are characteristic of true scleroderma as found in man.—E. G. White.

László, F. (1935). Ueber die pathologische Anatomie des subperitonealen Fettgewebes des Schweines. [**Pathological Anatomy of Subperitoneal Adipose Tissue of the Pig**].—*Dtsch. tierärztl. Wschr.* **43.** 773-774.

The author describes lesions, involving the adipose tissue in the sublumbar region of pigs, which vary in size from pea-sized areas to complete involvement of the subperitoneal fat in this region. The condition is met in animals of either sex ; it may be bilateral.

Histologically it consists of a hyperplasia of the connective tissue of the peritoneum and underlying fat, with formation of abundant collagen and elastic fibres. Multiple haemorrhages are present.

The cause of the condition is not known, but it is suggested that the hyperplasia may commence primarily in the peritoneum, the spread to the adipose tissue being of a secondary nature.—E. G. White.

Preussner, H. (1935). Die Differentialdiagnose von Ikterus und Futtergelb auf chemischen Wege unter besonderer Berücksichtigung des " Paratyphus ". [**Differential Diagnosis of Icterus and Yellow Pigmentation of External Origin**].—*Inaug. Diss., Berlin.* pp. 50. 1 table. [Numerous refs.]

The author studied exogenous and endogenous pigmentation in a large number of food animals. Martin's reaction and Ehrlich's diazo reaction were used for the detection of bile pigments ; the latter test is considered to be the more reliable.

The importance in meat inspection of differentiating endogenous from exogenous pigmentation is stressed. Whereas the latter is harmless and disappears on prolonged exposure to light, the former is usually associated with sepsis and is not affected by light.

Icterus in calves was commonly associated with the presence of paratyphoid infection.

It is recommended that the test for bile pigments be carried out as soon as

possible after slaughter, in order to reduce to a minimum the destruction of the enzymes on the presence of which the reaction depends.

The demonstration of bile acids is regarded as an unsuitable method for the detection of jaundice.—E. G. White.

Hamburger, C., Bang, F., & Nielsen, J. (1936). **Studies on Gonadotropic Hormones in Cases of Testicular Tumors.**—*Acta path. microbiol. scand.* **13.** 75-102. 9 figs., 2 tables. [12 refs.] [In English].

Recent work has suggested that the amount and type of gonadotropic hormone in the urine may be of significance in the diagnosis of various diseases of the testis and the authors have attempted to classify testicular tumours by an examination of their hormonal, histological and radiological properties. It is claimed that hypophyseal hormone may be distinguished from chorionic hormone by the fact that the former produces stimulation of numerous follicles in the infantile mouse ovary, whereas the latter only influences a few follicles. It was found that malignant testicular tumours could be divided into two groups, those which stimulate the hypophysis and those which themselves produce gonadotropic hormone identical to that of chorionic origin found in the urine of pregnant women. Histological examinations showed that the first group of tumours were seminomata and the second mixed epitheliomata. The seminomata are sensitive to X-ray treatment and are relatively benign, whereas the mixed epitheliomata are resistant to X-rays and are extremely malignant.—J. A. Nicholson.

Deobald, H. J., Elvehjem, C. A., Hart, E. B., & Halpin, J. G. (1936). **Availability of Calcium Salts for Bone Formation and Rickets Prevention in Chicks.**—*Poult. Sci.* **15.** 42-47. 3 tables. [9 refs.]

Chickens fed on a rachitogenic diet, supplemented with different Ca salts and varying levels of cod liver oil intake, had a better bone formation when soluble Ca salts were fed at critical cod liver oil levels than when insoluble salts were fed, though the difference was not so marked at higher levels. The availability of insoluble Ca salts was proportional to their acid solubilities, irrespective of the amount of cod liver oil fed.—Alfred Eden.

Mench, K. (1936). Maligne Endotheliome in der Milz eines Pferdes. (Ein Beitrag zur Differentialdiagnose bei ansteckender Blutarmut der Einhufer). **[Malignant Endothelioma in the Spleen of a Horse. Differential Diagnosis from Equine Infectious Anaemia].**—*Berl. tierärztl. Wschr.* **52.** 4-6. 3 figs.

A description of a case of suspected infectious anaemia in a 13-year-old mare, in which clinical and epidemiological findings were confirmed to a certain extent by blood examination. The only clinical finding not in agreement with this diagnosis is considered to be a hyperpyrexia which was most marked in the evenings ; the author's previous experience was that in cases of infectious anaemia the morning temperature is usually the higher.

Post-mortem examination showed a very enlarged spleen, weighing 42 lb., consisting mainly of a tumour which was diagnosed histologically as a malignant endothelioma.—E. G. White.

Zulinski, T. (1935). Wole rakowate u psòw w obrazie anatomo-patologic-znym. **[Malignant Neoplasms in Dogs].**—*Przegl. wet.* **48.** 409-437. 5 figs. on 3 plates, 1 table. [Numerous refs.]

The author carried out 450 *post-mortem* and histological examinations of the thyroid glands of dogs and found malignant neoplasms in 2·3 per cent. Such

neoplasms of the thyroid gland occur independently of sex or breed, but are frequently found in animals over seven years old. Usually the growth shows calcareous and cholesterolic degeneration. There is no connexion between the occurrence of goitre in human beings and such neoplasms of the thyroid gland in dogs, as the people of Lwów are generally free from disease of the thyroid gland.—K. SZCZUDLOWSKI (LWÓW).

PUBLIC HEALTH.

CRUMBINE, S. J. (1936). **Milk-Borne Epidemic Diseases in the United States and Canada, 1934.**—*Vet. Bull. U.S. Army.* **30.** 59-66. 4 tables.

For the year 1934 in the United States of America and Canada 21 health departments reported 44 milk-borne epidemics, involving 1,382 cases and 47 deaths, and 41 health departments reported " no epidemics ". Forty-three of the milk-borne epidemics were caused by raw milk. In one epidemic of scarlet fever, which occurred in three different camps, investigations disclosed that the milk supply was responsible ; although supposedly pasteurized, some of this milk may have been raw. The cases and deaths occurring in milk-borne epidemics in the U.S.A. during 1934 are given in the following table :–

Distribution by Disease.

Diseases.	Epidemics.	Cases.	Deaths.	States Reporting.
All diseases.	40	1,324	44	18
Diphtheria	1	9	0	1
Gastro-Enteritis ...	4	243	0	3
Scarlet Fever	3	128	2	3
Septic Sore Throat ...	9	610	15	7
Typhoid Fever... ...	21	315	25	12
Undulant Fever ...	2	19	2	2

—BRENNAN DEVINE.

RIDALA, E. (1935). Hügieenilisi uurimusi Tartu müügipiima kohta. [**Examination of Market Milk in Tartu**].—*Thesis, Tartu.* pp. 10. [Orig. not publ. : abst. from German version received from author].

The author has carried out extensive examinations of raw and of pasteurized market milk at different seasons of the year. Examinations were made for contamination with pathogenic bacteria and with common saprophytes of milk. In addition, the content of dirt, acid, fat and dry matter was ascertained and the specific weight and freezing-point were measured. A summary of the data is recorded, but the figures are unsuitable for abstraction.—E. J. PULLINGER.

MORGAN, M. T. (1935). **Some Details of the System of Health Inspection of Meat and Meat Products destined for Export, in the Great Abattoirs of South America.**—*Vet. J.* **91.** 509-518. 4 figs. on 2 plates. [Also appeared in *J. R. sanit. Inst.* **56.** 465-478].

The author, as the result of a visit to the great abattoirs of South America, has fully confirmed the opinions of previous official visitors, *e.g.* Dr MOHLER,

Colonel YOUNG, and others, as to the splendid organization of the abattoirs and the efficiency of the system of meat inspection as carried out under government veterinary administration. He states that the cattle, which are of the best butchers' type, are raised in a veritable paradise – great stretches of alluvial plain growing thick bush grass and lucerne, which enables feeders to finish the cattle fit for the " frigorifico " in two years. The system of *ante-mortem* inspection as also the slaughtering, dressing, and *post-mortem* examination are fully described and should be read by those interested in the subject of meat inspection.

The author concludes by stating : " I was struck by the extraordinary high standard of the service of inspection, and by the extreme cleanliness and the wonderful machine-like efficiency of these enormous factories . . . one must say that they are producing a quality of beef that is unexcelled, and they can export a product which should in itself be a stimulus to this country, whence came the best breeding stock, to promote better conditions for its own trade and to produce the same quality for the local market ".—T. DUNLOP YOUNG.

THERAPEUTICS.

HORNBY, H. E. (1935). **Tanganyika Territory. On the Nature of the Resistance to Treatment shown by Some Cases of Bovine Trypanosomiasis.**—*Rep. Dep. vet. Sci. Tanganyika, 1934.* pp. 37-39.

Although antimonial drugs remain the standard remedies for bovine trypanosomiases, some cases seem incurable and the question is asked whether it is due to special resistance on the part of certain strains of trypanosome or to host idiosyncrasy. Cattle inoculated from two cases, in which the disease was apparently incurable, responded satisfactorily to treatment. The conclusion is therefore drawn that unusual refractoriness to treatment is more often due to host idiosyncrasy than to special resistance on the part of the parasite.—S. A. EVANS.

KUHS, M. L., PFEIFFER, C. C., & TATUM, A. L. (1936). **A Study of the Curative Action of Arsenophenylglycine in *T. lewisi* Infections in the Rat.**—*Amer. J. Hyg.* **23.** 10-24. 6 figs., 4 tables. [12 refs.]

The authors show that *Tryp. lewisi* infections of the rat are easily cured by " A.P.G." provided that therapy is commenced on the third or fourth day after inoculation. They state that four days after inoculation the trypanosomes begin to lose their arsenic susceptibility and that by the tenth to 14th day a cure is usually impossible. They suggest that the curability of these infections depends upon the time the trypanosomes have lived within the rat and not on the number present in the blood.—R. FISHER.

HARVEY, F. T. (1936). **Red-Water Mortality.**—*Vet. Rec.* **16.** 217-218.

A brief note on the importance of redwater due to piroplasmosis in cattle in Cornwall [no statistics], and a reference to the value of " acaprin " in its treatment. —J. E.

TURGUT, M. (1935). Beygirde nutalyoz ve trypaflavin ile tedavi. [**Treatment of Equine Nuttalliasis with " Trypaflavine "**].—*Askerî tibbi baytarî mecmuasi.* **12.** 211-218. 1 graph. [7 refs.] [Abst. from German summary].

This is a report of a case of nuttalliasis in a horse. Two injections of " trypaflavine " on consecutive days (1 g. in 50 c.c. of distilled water) effected a complete recovery in a few days.

FAUST, E. C., & SWARTZWELDER, J. C. (1936). **Use of Liver Extract intramuscularly in the Course of Acute Amebiasis in Dogs.**—*Proc. Soc. exp. Biol., N.Y.* **33.** 514-518. [3 refs.]

The authors state that liver extract administered intramuscularly failed to control the disease in 14 dogs, although after the treatment all except one showed a high erythrocyte count and a fair haemoglobin percentage in spite of constant loss of blood.—R. FISHER.

BUTZ, L. W., & LA LANDE, W. A., Jr. (1934). **Anthelmintics I. The Effect of Hydrogen Peroxide and Some Oxygenated Terpene Hydrocarbons upon** *Ascaris lumbricoides.*—*J. Amer. pharm. Ass.* **23.** 1088-1094. 1 fig., 3 tables. [15 refs.] [Abst. from abst. in *Physiol. Abstr.* **20.** 344].

The authors discuss the anthelmintic activity of " ascaridole " (obtained from oil of chenopodium) and the toxicity to *A. lumbricoides* of H_2O_2 and of substances produced by passage of O_2 or air over *d*-pinene, turpentine or *d*-limonene.

SUNDBERG, R. (1936). Perniciös anämi hos häst. Terapeutiska försök. [**Treatment of Equine Infectious Anaemia with Potassium Permanganate**].—*Svensk VetTidskr.* **41.** 17-21.

The author used an intravenous injection of potassium permanganate, 4 g. in 800 c.c. of water being injected in two doses with an interval of eight days. He gave in addition digitalis, iron and arsenic as tonics. He reports seven cases which he considered to be infectious anaemia in which the effect of the treatment was successful. Unfortunately, however, the diagnosis has in no case been confirmed by histological examination of tissue obtained by liver puncture.

—H. BERTHELSEN (STOCKHOLM).

HART, G. H., & COLE, H. H. (1936). **Reproductive Hormone Therapy in Domestic Animals.**—*J. Amer. vet. med. Ass.* **88.** 12-23. [Numerous refs.]

This article gives a comprehensive survey of our present knowledge regarding the origins, actions and interrelations of the hormones controlling the processes of reproduction in mammals. Data are also presented bearing on the application of the hormones to problems of reproduction in domestic animals.—A. ROBERTSON.

SABALITSCHKA, T., & DÜRRMAN. (1936). Ueber den Einfluss von Fetten und fettähnlichen aliphatischen Kohlenwasserstoffen auf die Wirkung von Desinfizientien. [**Influence of Fats and Fatty Aliphatic Carbohydrates on Action of Disinfectants**].—*Berl. tierärztl. Wschr.* **52.** 84-86. [14 refs.]

The authors re-emphasize the well-known fact that the presence of oil or oily substances interferes with the destructive action of certain disinfectants. The action of phenol is considerably delayed by such substances whilst that of resorcin is accelerated. The degree of solubility or of miscibility of the disinfectant in oil or water determines the degree of success of disinfection attained in that particular medium. The choice of disinfectant should depend upon the nature of the substance to be treated.—E. J. PULLINGER.

POISONS AND POISONING.

I. CLOUGH, G. W. (1936). **The Sources of Some Poisons and their Effects on Animals.**—*Vet. Rec.* **16.** 53-67. 1 table.

II. —. (1936). **Veterinary Toxicology.**—*Ibid.* 67-68.

I. This is a very able account of substances which commonly cause poisoning in domesticated animals, and of the sources from which they are derived; it should be read by all interested in veterinary toxicology. The problem is discussed under the following headings:– industrial poisons, lead and its common toxic compounds, weed killers, warble fly dressing, worm killer, vermin killers, drugs, foods and poisonous plants. Many useful references are given.

II. Only through the co-operation of the botanist, chemist and pharmacologist can the poisonous properties of plants be elucidated, and until this is accomplished no scientific treatment can be evolved. This editorial article is a plea for more intensive research into the causes of poisoning of stock, which would amply repay the financial outlay involved.—G. D. SHEARER.

SMITH, S., & HENDRY, E. B. (1934). **Arsenic in its Relation to the Keratin Tissues.**—*Brit. med. J.* Oct. 13th. 675-677. 4 tables. [2 refs.]

It was shown by *in vitro* experiments that keratin tissues such as hair and nails exhibit preferential absorption when soaked in arsenical solutions. The absorbed arsenic can be partly removed only by very prolonged soaking in distilled water, but arsenic absorbed *in vivo* cannot be removed thus. Arsenic can travel along a hair fibre only if "creeping" of the solution along the outside of the hair is possible.—R. ALLCROFT.

BOUGHTON, I. B., & HARDY, W. T. (1934). **Chronic Copper Poisoning in Sheep.** —*Bull. Tex. agric. Exp. Sta.* No. 499. pp. 32. 5 figs., 8 tables. [18 refs.]

The so-called icterohaemoglobinuria in sheep in West Texas has been proved to be chronic copper poisoning due to the ingestion, over periods varying from a few months to several years, of salt licks containing copper used to control stomach worm infestation. Icterus, haemoglobinuria and a bloody nasal discharge were characteristic symptoms.

Post-mortem examination showed generalized icterus, the liver was slightly enlarged and friable and the gall-bladder distended with thick greenish-brown bile. The kidneys were greatly enlarged and showed a black marbled surface when the capsule was removed. The tissue was friable and tore easily. The spleen was always enlarged with the parenchyma deep brown to black in colour.

The disease was reproduced in sheep by feeding the suspected salt licks. Chemical analyses of the livers of experimental and natural cases revealed the presence of large amounts of copper. There is no danger of copper poisoning arising from the routine drenching of sheep with copper sulphate to control stomach worms [this *Bull.* **5.** 855].—G. D. SHEARER.

I. FRANKE, K. W., RICE, T. D., JOHNSON, A. G., & SCHOENING, H. W. (1934). **Report on the Preliminary Field Survey of the So-Called "Alkali Disease" of Livestock. (Connexion with Selenium in Forage).**—*Circ. U. S. Dep. Agric.* No. 320. pp. 10. 7 figs. [6 refs.]

II. BEATH, O. A., EPPSON, H. F., & GILBERT, C. S. (1935). **Selenium and other Toxic Minerals in Soils and Vegetation.**—*Bull. Wyo. agric. Exp. Sta.* No. 206. pp. 56. 14 figs., 7 tables. [16 refs.]

I. Foodstuffs grown in certain soils in Southern Dakota and Northern Nebraska are rendered toxic to horses, cattle, swine and poultry, and it is suggested that a toxic mineral, probably selenium, is absorbed from the soil. Animals should not, therefore, be allowed to graze over such areas nor be fed on foodstuffs grown on such soils.

II. This is a further contribution to the study of absorption of selenium

by plants grown on selenium-containing soils [see also this *Bull.* **5.** 381 and 854, and **6.** 81 and 269]. Ingestion of these selenium-containing plants may cause " alkali disease " or " blind staggers " in cattle. The selenium is localized principally in the cretaceous shales of Wyoming and is readily absorbed by such plants as woody aster, *Oonopsis* sp., *Stanleya* sp. and *Astragalus* sp. When these plants wither and die the selenium is returned to the soil in a form readily available to forage and grain crops. The available selenium, not the total selenium, in the soil is the important consideration. Molybdenum and tellurium are also found in these soils. Farms on selenium-containing soils should be planted with forages which are not capable of absorbing selenium. Lists are given of plants which absorb and others which do not absorb selenium from selenium-containing soils.
—G. D. SHEARER.

FRANKE, K. W., & TULLY, W. C. (1935). **A New Toxicant Occurring Naturally in Certain Samples of Plant Foodstuffs. V. Low Hatchability due to Deformities in Chicks.**—*Poult. Sci.* **14.** 273-279. 10 figs., 2 tables. [Numerous refs.] [For abst. of previous article of this series, see this *Bull.* **6.** 84].

TULLY, W. C., & FRANKE, K. W. (1935). **A New Toxicant Occurring Naturally in Certain Samples of Plant Foodstuffs. VI. A Study of the Effect of Affected Grains on Growing Chicks.**—*Ibid.* 280-284. 2 tables, 4 charts. [4 refs.]

These articles record further experiments and observations on the effects of feeding " alkalied " grain [grown on land where " alkali disease " occurs – see previous abst.] to fowls. In investigations made into the low hatchability of eggs in certain localities in South Dakota, evidence was obtained that this low hatchability was due to abnormal development with the production of monsters. On the incubation of two lots of eggs from one affected farm the hatchability proved as low as 4 per cent. and 12 per cent., whilst in a setting from another affected farm it was as high as 70 per cent. It is suggested that an abnormal constituent was present in the eggs during the period of incubation and that the increase in the hatchability, from 4 per cent. in the first series to 70 per cent. in the third series, was due to the feed which the hens received, supplementary to the grain ration, as the year advanced.

On the experimental feeding of " alkalied " grain to chickens it was found that feeding with 65 per cent. affected grain inhibited growth, and delayed and reduced egg production, whereas when 25 per cent. affected grain was fed, practically normal growth resulted and, in one case, the egg production exceeded that of a control pen.—U. F. RICHARDSON.

DUDLEY, H. C. (1936). **Toxicology of Selenium. I. A Study of the Distribution of Selenium in Acute and Chronic Cases of Selenium Poisoning. II. The Urinary Excretion of Selenium.**—*Amer. J. Hyg.* **23.** 169-180 and 181-186. 4 tables. [17 refs.]

I. In animals fed selenium in the form of organic or inorganic compounds, selenium was found in all parts of the body, but in widely varying amounts. In cases of acute poisoning the liver and kidneys contained the greatest amounts, ranging from 4 to 25 parts per million. In a few cases of chronic poisoning in cattle 8 to 20 parts per million of selenium were found in the hoofs. Examination of the blood showed a range of from 7 to 27 parts of selenium per million. A horse receiving sodium selenite in the food showed the presence of a selenium-protein complex in the blood corpuscles. The selenium eliminated in the urine of this animal was present as an ether-soluble volatile compound.

II. Employees in a copper refinery engaged in extracting selenium from the ore showed the presence of selenium in the urine in concentrations ranging from a trace to 6·9 parts per million. Normal human urine was found to contain no trace of selenium. The symptoms observed in the cases examined were a garlic odour of breath, nervousness, gastro-intestinal disturbances and pallor. —G. D. SHEARER.

LEEMANN, A. C. (1935). **Hydrocyanic Acid in Grasses.**—*Onderstepoort J. vet. Sci.* **5.** 97-136. [Numerous refs.]

In this paper an attempt is made to give a synoptic and constructive account of our present day knowledge of the problem of prussic acid in grasses. A list is given of 88 grasses in which prussic acid has been detected. The methods of extraction are discussed to some extent and the errors which may occur in quantitative determinations. The possibility of another toxic substance besides prussic acid being involved in the rapid death of the animals is discussed and a brief reference is made to antidotes. A review is given of the more important theories and views on the origin of prussic acid in the plant, a still unsolved problem. The effect of climate and soil in influencing the toxicity of plants is discussed, and the effect of wilting.—E. M. ROBINSON.

ISNARD, J. (1936). Contribution à l'étude des torteaux de lin cyanogénétiques. [**Hydrocyanic Acid Poisoning from Linseed Cake**].—*Rev. vét., Toulouse.* **88.** 74-79. [16 refs.]

The author considers that linseed cake which is capable of producing more than 0·19 parts per 1,000 of HCN will cause poisoning when eaten in normal amounts. None of the methods used for rendering toxic samples harmless are capable of economic application on the farm. Samples of cake which liberate small non-toxic amounts of HCN should not be fed to stock as they lead to loss of weight and progressive anaemia.—G. D. SHEARER.

SHARMA, G. K. (1935). **Jowar** (*Sorghum vulgare*) **Poisoning in Cattle.**—*Indian J. vet. Sci.* **5.** 376-380. [13 refs.]

This is an account of the symptoms, *post-mortem* findings and treatment of hydrocyanic acid poisoning in cattle.—G. D. SHEARER.

LOMINET, M., & LAVIEILLE. (1936). Intoxication de bovins par la fougère aigle. [**Bracken Poisoning in Cattle**].—*Rec. Méd. vét.* **112.** 11-14. [1 ref.]

This is a record of bracken poisoning in cattle in which four out of six died over a period of 11 days. The symptoms were laboured breathing, abundant salivation, elevated temperature (41·5° to 42°C.), bloody discharge from the nose and blood-streaked faeces. *Post-mortem* examination revealed petechiae on the heart, the small and large intestines, the peritoneum and the pericardium. Bacteriological examination of the blood was negative. Three-quarters of the food was composed of bracken. Eight calves in the same building showed no signs of poisoning.—G. D. SHEARER.

MATHEWS, F. P. (1934). **Psilostrophe Tagetinae and Psilostrophe Gnaphalodes, Two Plants Poisonous to Sheep and Cattle on the Ranges of the Southwest.** —*Bull. Tex. agric. Exp. Sta.* No. 500. pp. 13. 1 fig., 1 table. [1 ref.]

Prolonged feeding trials with sheep with these two plants produced death in from 40 to 60 days. The toxicity decreased with the age of the plant. Affected animals showed weakness and regurgitation of food. On *post-mortem* examination

no macroscopic lesions were observed. Serious losses were prevented by rotating sheep from infested to non-infested pastures. No remedy is known.—G. SHEARER.

KAISER, L. (1935). Toxicologische Untersuchungen einiger Derrispräparate. [**Toxicological Investigations of Some Derris Preparations**]. *Inaug. Diss., Hanover.* pp. 63. 3 figs., 8 tables. [11 refs.]

The toxicology of three commercial preparations of derris root—Panderran mixture A, Panderran mixture B and Panderran oil—has been determined by means of experiments on mice, rabbits, dogs and frogs. When applied to the skin, toxic symptoms could be produced even with 0·01 per cent. solutions of derris and it became evident that the extent of the area treated, rather than the concentration of the solution used, was the deciding factor in the production of ill effects.

If given by the mouth or subcutaneously, severe symptoms of poisoning were easily produced. These did not differ from those produced by the application of the preparation to the skin and consisted of restlessness, salivation, spasmodic convulsions, dyspnoea, collapse and death. When given intravenously, the preparations produced a fall in blood pressure, decrease in the amplitude and rate of the heart beats and brought the heart to a standstill in systole.

The author concludes that the following precautions should be taken when applying derris to the skin. The concentration of derris should not exceed 0·1 per cent., large surfaces should not be treated at the same time, steps should be taken to prevent the animal licking the part treated and the operator should not apply the dressing with his naked hand.—G. D. SHEARER.

STEYN, D. G. (1935). **The Detection of Strychnine in Carcasses and Corpses.** *Onderstepoort J. vet. Sci.* **5.** 139-174. 8 tables. [Numerous refs.]

This investigation was carried out to determine whether the biological test was necessary in the detection of strychnine in carcasses or corpses. It was found that, in order to express a definite opinion as to the presence of strychnine, it was essential to do the taste test, the colour test and the biological test. At least ·008 mg. of strychnine sulphate is required to produce spasms in a three-weeks-old mouse weighing from 10 to 12 g. Strychnine was detectable in the carcasses of three out of four dogs killed with it ten weeks previously, one of them having been buried for 18 weeks. It was detectable in the carcasses of four out of eight dogs buried 11 months previously. Methods of extracting strychnine from carcasses are discussed.—E. M. ROBINSON.

BLASCHKE, F. (1935). Exanthema durch Kartoffelkrautfütterung. [**Exanthema in Cattle caused by Potatoes**].—*Prag. tierärztl. Arch.* **15.** 249.

This is a record of exanthema in cattle probably due to the feeding of potato tops. The trouble ceased with the removal of the tops.—G. D. SHEARER.

RICHOU, R., & EICHORN, E. (1936). De l'absence d'anti-abrine d'origine naturelle, chez l'homme et différentes espèces animales. [**The Absence of Natural Resistance to Poisoning by Abrin in Man and Animals**]. *C. R. Soc. Biol. Paris.* **121.** 307-309. [10 refs.]

The sera of 10 human beings, 12 monkeys, 23 horses, 11 sheep, 35 rabbits, 13 guinea pigs, 1 pig and 1 hedgehog were tested for the presence of abrin antitoxin by mixing with an abrin solution and injecting the mixture subcutaneously into guinea pigs. In no case was the toxicity of the abrin solution reduced by mixing with the serum, from which the authors conclude that abrin antitoxin is never present in the serum of animals or man under natural conditions.—G. D. SHEARER.

COOK, S. F., & SCOTT, K. G. (1935). **Apparent Intoxication in Poultry due to Nitrogenous Bases.**—*Science.* **82.** 465-467. [5 refs.]

The authors report intoxication in poultry due, they believe, to the feeding of a diet containing fish meal of a low sulphur content. Poisoning was due to the nitrogen basis in the fish meal. Similar symptoms were produced by the addition of various nitrogenous bases, (monomethylamine, dimethylamine, trimethylamine, etc.) to the diet. Various methylamines were isolated from the fish meal. The addition of sulphur or of sulphur containing reducing agents, cystine or cysteine, alleviated the symptoms. Fish meal with a high sulphur content, although containing methylamines, failed to produce evidence of poisoning.—G. D. SHEARER.

PHYSIOLOGY.

FRENCH, M. H. (1935). **Tanganyika Territory. Preliminary Blood Survey of Masai Cattle in Drought Periods.**—*Rep. Dep. vet. Sci. Tanganyika, 1934.* pp. 65-68. 3 tables.

The author gives a description of stock suffering from water and grazing shortages. Blood analyses were made on cattle that had been deprived of water for two or three days. No gross deviations from normal were found in the mineral constituents though haemoglobin was generally low.

The drinking of a large quantity of water after a three days' thirst appeared to cause a temporary dilution of the blood.—S. A. EVANS.

HERNANDEZ, A. C., & FONTECHA, R. R. (1935). El quimismo hemático en los bóvidos. I. Estudio sobre la glucemia. [**Blood Chemistry of Bovines. I. Sugar**].—*An. Esc. sup. Vet. Madrid, 1935.* pp. 43-48. [9 refs.]

Blood sugar analyses were conducted on the following bovines :– 3 Friesian calves, 3 calves of native breed, 7 yearling Friesians, 14 Friesian cows, 5 native-bred cows, 9 Friesian and Swiss bulls and 23 native bulls and steers. The average sugar content per litre in the Friesian cows was 0·825 g., in native cattle 0·732 g., in the dairy bulls 0·87 g., and in the native bulls and steers 0·75 g. In young animals the sugar content was higher in males than in females, and the average was higher than in older animals [the figure for Friesian cows is given as 1·825 due to an error in printing].—R. S. ROBERTS.

JÄGER, A. (1935). Die Anordnung und Stellung der roten Blutkörperchen im strömenden Blut. [**Arrangement and Position of Blood Cells in the Circulating Blood**].—*Pflüg. Arch. ges. Physiol.* **235.** 705-722. 8 figs. [Numerous refs.] [Copied *verbatim* from *Physiol. Abstr.* **20.** 815. Signed J. M. ROBSON].

Experiments were performed on the bloodvessels (especially the mesentric vessels) of the frog. The red cells are arranged in the circulating blood with their surfaces parallel to the vessel wall. A vessel shows a dark peripheral zone and a lighter axial zone. When 2 blood vessels unite, the 2 streams do not mix ; dark stripes due to edging of the red cells show the boundary of the streams. In the arteries the zone of plasma becomes broader, during systole and narrower as the velocity of the blood decreases. In curves in arteries the more rapidly flowing internal blood strata approximate towards the external side of the curve. In vessels of about 0·02 mm. in diameter the zone of plasma is very broad in relation to the diameter of the vessel. The red cells are packed closely together in the centre ; this arrangement is especially marked at high velocities.

HEYN, G. (1936). Ueber das Blutbild der Hühner und seine einheitliche wissenschaftliche Untersuchung und Beurteilung an Hand eines Hämogrammes. **[Blood Picture of Birds]**.—*Berl. tierärztl. Wschr.* **52.** 51-52. 1 table. [12 refs.]

The author records in summary form his opinions regarding the constitution of the haemopoietic system of the bird. A systematic method of recording blood examinations is included.—E. J. PULLINGER.

BRESSOU, C., & LE GALL, J. (1936). Contribution à l'étude de la vascularisation de l'utérus des ruminants. **[The Vascular System of the Uterus of Ruminants]**.—*Rec. Méd. vét.* **112.** 5-9. 3 figs.

In the cow, the cotyledons receive their blood supply for the most part from the terminal branches of the main uterine artery as well as, to a small extent, from the uterine branch of the utero-ovarian artery. The ramifications of these vessels are described in detail and illustrated by diagrams. The authors consider that the distribution of the vessels and the modifications of their structure are designed to secure an efficient circulation and a constant blood pressure in the cotyledons.

In the ewe, the blood supply to the uterus resembles that in the cow except that the uterine horns are supplied by a special branch of the uterine artery, the utero-ovarian vessel supplying only the ovary and fallopian tube.—E. G. WHITE.

CLARK, C. F. (1936). **Does the Right Ovary of the Bovine Function more frequently than the Left?**—*J. Amer. vet. med. Ass.* **88.** 62-65. 3 tables. [11 refs.]

It has frequently been stated that the right ovary of the bovine functions more frequently than the left. The author made rectal examinations in 704 cases of single pregnancy and in these 42 per cent. were in the left uterine horn and 58 per cent. in the right uterine horn. The majority of cases were followed to parturition and the sex of the offspring was determined. It was found with both ovaries that ova were produced which developed into individuals of either sex with approximately equal frequency.—A. ROBERTSON.

KINGMAN, H. E. (1936). **Artificial Insemination.**—*J. Amer. vet. med. Ass.* **88.** 126-138. 1 fig.

The author discusses reasons for investigating and developing means of artificial insemination of animals. Methods of collecting semen are described as also the macroscopic and microscopic examination of the semen, methods of dilution and the technique of insemination used by the author.—A. ROBERTSON.

SRNETZ, A. (1935). Beitrag zur Physiologie der Riechaktes. **[The Respiratory Smell Reflex]**.—*Wien. tierärztl. Mschr.* **22.** 753-767. 13 charts. [16 refs.]

The author records experiments on the respiratory movements of domestic animals subjected, after being blindfolded, to pleasant and unpleasant odours. The results were recorded on a smoked drum connected to an appropriate apparatus secured to the chest. Odours set up the well-known sniffing act, which is greatest in dogs. The respiratory movements performed during sniffing are a series of rapid shallow respirations with the lungs full of air, *i.e.* sniffing takes place immediately after an inspiration. The action may last either for a few seconds in dogs before the resumption of normal breathing, or may be continued for a long time and be superimposed on normal respiration, as when following a trail. Cats, horses, cattle and swine react to a less degree than dogs.—J. E.

DeVine, B., & Dawes, H. W. (1935). **Further Observations on the Dentition of Pigs.**—*Pig Breed. Annu.* **14.** 41-47. 5 figs.

As the result of four years' special investigations, the authors lay down standards for judging the age of pigs at agricultural shows.

Pigs having any one of their permanent corner incisors cut are over six months old. Pigs having their permanent central incisors up and any of the first three permanent molars cut are over one year old. Pigs having their temporary lateral incisors shed and the permanent ones appearing exceed 15 months and pigs having their permanent lateral incisors up exceed 18 months.—J. E.

Zuckerman, S. (1936). **An Embryological Interpretation of Changes induced by Oestrogens in the Male Reproductive Tract.**—*Lancet.* **230.** 135-136. [12 refs.]

From a study of the effects of oestrone on the epithelium of the male reproductive tract, it appears that oestrogens act not only on Müllerian epithelium but also on epithelium derived from the primitive urogenital sinus. In male monkeys, the response to oestrone is limited to the epithelium of the urethra and uterus masculinus, the changes being similar to those produced in the vagina. The urethral openings of the prostatic glands are situated in the region of the urethra sensitive to oestrone and the posterior lobe of the prostate develops from areas sensitive to oestrone. Since a chemical relationship between oestrogens and some carcinogens has been established, it may be of significance that primary carcinoma commonly originates in the posterior lobe of the prostate.—J. A. N.

Catchpole, H. R., & Cole, H. H. (1934). **The Distribution and Source of Oestrin in the Pregnant Mare.**—*Anat. Rec.* **59.** 335-347. 3 tables. [17 refs.]

Continuing their earlier work, the authors made a quantitative study of the distribution of the oestrin in maternal and foetal tissues. Using the mouse test, oestrin was demonstrated in the kidneys, endometrium and ovaries of mares and in foetal liver, kidneys and gonads. It appears certain that the kidney removes oestrin from the blood stream since no tissue was found which contained a concentration of oestrin comparable to that found in the urine. Evidence was also obtained that, in the pregnant mare, the placenta possesses the power of producing oestrin.—J. A. Nicholson.

Deanesly, R., & Parkes, A. S. (1936). **Testosterone.**—*Brit. med. J.* March 14th. 527-528. 1 table. [15 refs.]

A comparative study of the gonadotropic action of testosterone, the hormone isolated from testis, and androsterone, the male hormone isolated from urine. Both have been synthesized from cholesterol. Testosterone was shown to be much more potent than androsterone on castrated rats. Results are also given for methyl and benzoyl derivatives of testosterone.—J. E.

Hill, R. T., Turner, C. W., Uren, A. W., & Gomez, E. T. (1935). **Hypophysectomy of the Goat.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 230. pp. 18. 7 figs., 1 table. [Numerous refs.]

In studying the relation of the pituitary gland to lactation, the authors decided to use goats in place of the small animals which have previously been utilized in this work. As goats may be milked, an exact record of production may be obtained and the effect of replacement therapy quantitatively measured. Also, since endocrine study has shown so many species differences, it was thought desirable to investigate the physiological response of a ruminant to removal of the pituitary gland.

The present bulletin gives in detail the method of hypophysectomy which has been found most successful. The pituitary is approached by a parapharyngeal route, exposing the gland through an oval hole drilled through the sphenoid bone. The rete mirabile which surrounds the pituitary is coagulated with an electrical high-frequency cautery. It is then possible to coagulate the pituitary and remove it in a charred condition.—A. ROBERTSON.

SILBERBERG, M. (1936). **Effects of Extract of Cattle Ant. Pituitary on Endochondral Ossification in Thyroidectomized Young Guinea Pigs.**—*Proc. Soc. exp. Biol., N.Y.* **33.** 554-558. 1 graph. [2 refs.]

The author studied the influence of an acid extract of the anterior pituitary gland of cattle on the growth of bone and cartilage in thyroidectomized young guinea pigs. He found that it caused a hypertrophy and hyperplasia of the different cell layers of the chondrophyte and epiphyseal line with subsequent rapid calcification and premature closure of the latter. He concluded that anterior pituitary extract exerts its influence on bone and cartilage without the mediation of the thyroid gland.—A. ROBERTSON.

BANG, O., & DAHM, C. R. (1934). Einige Analysenergebnisse von Mineralstoffwechselversuchen mit Pferd und Kuh. [**Mineral Metabolism Experiments on Horses and Cows**].—*Skand. Arch. Physiol.* **69.** 1-32. 7 tables. [Numerous refs.] [In German].

Mineral balance experiments were carried out with a horse and with a cow. In the horse two-thirds and in the lactating cow one-fortieth of the total mineral loss occurred *via* the urine.

The horse, when receiving bran and water as sources of mineral, showed a marked negative imbalance to calcium and phosphorus and a slight negative imbalance to magnesium. The addition of available sodium ions to the ration in the form of $NaHCO_3$ slightly reduced the loss of Ca but did not influence P metabolism. The effect of sodium was temporary, lasting only as long as it was administered. With a combined ration of bran and calcium phosphate the negative imbalance was eliminated.

A non-pregnant lactating cow fed on hay alone showed a moderate negative imbalance to Ca and P but was slightly positive to Mg. The addition of cane sugar had no influence, but a positive imbalance was obtained with a mixture of hay and bran. Feeding lucerne produced a positive Ca and a negative P balance.

The significance of these findings is discussed. In the horse, a high P content of the alimentary tract in neutral or basic solutions causes precipitation of any Ca which is present. In this way an excess of P in the ration may produce a negative Ca imbalance.—E. J. PULLINGER.

FRENCH, M. H. (1935). **Tanganyika Territory. Some so-called "Salt Licks" of Tanganyika Territory.**—*Rep. Dep. vet. Sci. Tanganyika, 1934.* pp. 69-72. 1 table.

Sixteen samples of edible earths from diverse localities were analysed and the results are given. It appears that the craving for licks is prevalent in most districts and that the composition of the lick does not reflect the nature of any pasture deficiency. The stock will eat any earth which is better than the dominant soil of the area. Sodium was the chief water-soluble cation with chlorides, carbonates and sulphates as the most important anions.—S. A. EVANS.

SLOAN, H. J. (1936). **The Operative Removal of the Yolks from Newly-Hatched Chicks.**—*Poult. Sci.* **15.** 23-27. 4 figs. [1 ref.]

This paper describes the operative technique for the removal of the yolk sac from newly-hatched chicks. The yolk sac was removed through a small incision in the ventral wall of the abdomen. The yolk stalk was cut and cauterized, and the incision closed with thread sutures. The effects of the operation apparently were not severe and the mortality resulting from the operation was low. It is thought that the use of chicks in which the yolk sacs have been removed will simplify vitamin studies, as these studies are usually complicated by the vitamins present in the yolk.—R. F. GORDON.

MISCELLANEOUS.

DU TOIT, P. J. (1935). **Acclimatization of Animals.**—*S. Afr. med. J.* **9.** 739-741. [10 refs.]

In attempting to acclimatize European cattle to South African conditions, various environmental conditions have to be taken into account. These include nutritional conditions of the South African veldt, disease, stock management and climatic factors. These four factors are interwoven in their effect on animals. The paper is mainly devoted to a consideration of what would happen if animals were introduced from a temperate to a semi-tropical climate. Reference is made to breeding experiments carried out with cattle in South Africa where indigenous cows were graded up with bulls of imported breeds. Evidence is brought forward to show that, unless environmental conditions can be improved, imported breeds will undergo a progressive deterioration.—E. M. ROBINSON.

STAPLES, R. R. (1935). **Tanganyika Territory. Notes on the Pastoral Conditions in the Central Province.**—*Rep. Dep. vet. Sci. Tanganyika, 1934.* pp. 91-98. 1 fig. on 1 plate.

A descriptive article dealing with the climate, soils, human and stock populations, and vegetational coverings of one of the large stock-producing areas of the Territory. The problems of bringing about efficient grazing so as to avoid soil erosion and to reclaim much of the already eroded areas are discussed. Recommendations are made for the improvement of the area which include limitation of stock numbers, rotational grazing, bush-clearing, and planting of good pasture grasses.—S. A. EVANS.

—. (1934). O instituto de biologia animal e suas finalidades. [**The Institute of Animal Biology (Rio de Janeiro) and its Aims**].—*Rev. Dep. nac. Prod. anim.* **1.** Nos. 5-6. 1-24. 11 photographs.

This Institute has come into existence as a result of the reorganization of services relating to the livestock industry. It consists of three sections – administrative, technical and experimental. The technical section is concerned with the investigation and preparation of therapeutic and biological products, analyses and examination of farm animal produce, study of food and poisonous plants, and experimental work in connexion with feeding. The experimental departments are concerned with investigations relating to breeding and acclimatization of poultry, infectious diseases of poultry, teaching of poultry husbandry, and the breeding of experimental animals for other sections.—R. S. ROBERTS.

OFFICIAL AND OTHER REPORTS.

GOLD COAST COLONY. (1935). **Report on the Department of Animal Health for the Year 1934-35.** [STEWART, J. L.] pp. 35. 4 tables, 1 map, 1 appendix. Accra : Govt. Printing Dep. [fcp] [2s.]

The staff consisted of the Director and four Veterinary Officers. The department was in a prosperous financial position, income exceeding expenditure by over £2,000.

FIELD VETERINARY WORK.—During the year, the initial anti-rinderpest immunization of all the cattle in the country was completed by the treatment of 30,000 head of stock in the coastal cattle belt. Elsewhere anti-rinderpest immunization consisted in treating the young susceptible two-year-old bovines at district camps, thereby maintaining the defence against rinderpest. Before the inception of the immunization scheme, the disease used to sweep the country and the cattle industry was in a precarious state. The Gold Coast cattle, the unhumped West African shorthorn breed, is very susceptible to rinderpest and great care is necessary during immunization to prevent undue mortality. The technique used is to give an initial small dose of vaccine and double inoculate with serum and virus some ten days later. This yields benign reactions and, at the same time, immunity tests have shown that a solid immunity has been acquired. In spite of the fact that every bovine over two years old has been treated, outbreaks of rinderpest frequently appear among the young susceptible cattle which have not yet been immunized. This is a good example of the susceptibility of the cattle. These natural outbreaks are treated by serum and vaccine inoculations. In the neighbouring French colonies, rinderpest outbreaks are treated as they appear and there is no scheme of immunization ; hence the Gold Coast Colony is continually being invaded by the disease from infected cattle crossing the frontier. Quarantine stations on the frontiers exist for trade cattle where, if disease appears, it is handled by veterinary staff and prevented from entering the country, but infection occurs through cattle crossing the frontier in ones and twos for dowry purposes. Over 40,000 head were immunized during the year with a mortality of slightly over 1 per cent.

Contagious bovine pleuro-pneumonia appeared in several outbreaks of more than usual severity. Until the advent of anti-rinderpest immunization, the latter disease masked " pleuro-pneumonia ". The laboratory has produced an efficient vaccine by Bennet's method.

The incidence of rabies has increased and presents considerable anxiety.

A successful serum against fowl cholera was produced.

As regard tsetse eradication and trypanosomiasis, the big-scale clearing experiment at Pong-Tamale to eradicate flies of the *Glossina palpalis* group from the area, which commenced in 1931, continues to yield good results, punctuated with new problems from time to time. Tsetse flies of this group breed and have their existence in low shade adjacent to water.

The observations made during the last two years on the Pong-Tamale clearings, on other rivers and on work carried out elsewhere lead to the following conclusions:–

(1) That flies of the *palpalis* group can be found at every river, stream and water-hole where permanent water and low shade exist in the Northern Territories.

(2) That small clearings are of very little use in the savannah type of country which is common over most of the Northern Territories.

(3) That clearing of streams and rivers with trained gangs, properly equipped with tools, can be done at a very low cost.

(4) That, in future clearings, certain trees should be stumped. This would add very little to the cost.

The infection rate of flies examined microscopically remains high (11.1 per cent.).

ANIMAL HUSBANDRY.—Cattle improvement continues to follow the lines of improvement within the breed (West African shorthorn) and judicious crossing

with other West African breeds. The type of West African shorthorn called the N'Dama, native of the mountainous regions of French Guinea, is the best variation and is being much used in this development. Imported pigs and poultry give good results. The centre of stock improvement is the government farm at Pong-Tamale. From there improved stock are sent to Native Administration farms, which supply the village herds with better animals. Mixed farming is encouraged and demonstrations of improved methods of ploughing and manuring are given at Pong-Tamale.

HONG KONG. (1935). **Report of the Colonial Veterinary Surgeon for 1934.** [MACKENZIE, W. J. E.] pp. 5. 2 tables. [8vo].

The report deals mainly with the results of the supervision of abattoirs and the control of animals and their diseases in quarantine depots. About half a million animals passed through the abattoirs. Six cases of anthrax, 8 of bovine tuberculosis, 57 of foot and mouth disease, 2 of glanders, 16 of swine erysipelas, 30 of swine fever and 14 cases of rabies in dogs were observed.

There are in the colony 530 horses, 2,900 head of cattle and 250 goats.

—F. H. MANLEY.

GREAT BRITAIN. (1935). **On the State of the Public Health. Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1934.** [MACNALTY, A.] pp. iv+207. 67 tables. [Numerous refs.] London: H. M. Stat. Off. [8vo] [1s.]

UNDULANT FEVER.—A review is given of the 261 authenticated cases which had been observed in Great Britain. Their relationship to animal infection was discussed in the report for the previous year.

PSITTACOSIS.—One case was recorded in a woman who was infected from budgerigars. The disease was found in two consignments of parakeets imported from Australia.

MILK (SPECIAL DESIGNATIONS) ORDER, 1923.—The number of licences for "Certified" and Grade A (T.T.) milk in force in England at the end of 1934 was 597, a net increase during the year of 137; in Wales the number was 102, an increase of 33. An increase was anticipated because of the general improvement of conditions throughout the country and also because of the fact that sales of tuberculin-tested grades of milk are exempted from the operation of the Milk Marketing Scheme. Only one licence was revoked because of the failure of the licensee to comply with the bacteriological limits.

It is pointed out that the primary object of the Milk (Special Designations) Order is not the eradication of tuberculosis from herds, but the prevention of infection of the milk with bovine tubercle bacilli. A fair measure of success in this respect is claimed. Reference is made to the Tuberculosis (Attested Herds) Scheme of the Ministry of Agriculture and Fisheries and to the practical difficulties which have to be overcome to eradicate bovine tuberculosis. Certain additional precautions which must be taken in addition to those included in the requirements of the Milk (Special Designations) Order are mentioned, *e.g.* efficient cleansing and disinfection of premises occupied by reactors, isolation of pigs and poultry from dairy cattle, attention to boundary fences and control of water supply.

The percentage of reactors found in new herds varied, probably depending upon the number of preliminary tuberculin tests carried out before the official test for the licences; the herds of many new licensees who previously produced Grade A milk were found to contain a high proportion of reactors, 50 per cent. being unexceptional. It is concluded from this that quarterly veterinary inspection

together with improved sanitation and hygienic conditions do not materially reduce tuberculosis infection in cattle.

Tubercle bacilli were reported to have been found in designated milk supplied by four producers in England and by one producer, on two occasions, in Wales. Investigation was carried out in all cases ; in England in only one case was the animal responsible discovered ; in Wales the cows were discovered on both occasions. Such animals are dealt with under the Tuberculosis Order of 1925.

The important distinction between " clean milk " and " safe milk " is emphasized ; the former is produced and distributed with the minimum amount of extraneous contamination while the latter contains no pathogenic organisms. The chief diseases which may be conveyed by milk are bovine tuberculosis, *Brucella abortus* infection and septic sore throat due to haemolytic streptococci. It is considered that at present the ordinary raw milk supply cannot be regarded as safe and suitable and that heat treatment such as efficient pasteurization is essential.

MEAT INSPECTION.—Inspection of home-killed meat remains unstandardized, varying from a thorough examination of every carcass in some districts to almost nothing in others. After consideration of the Economic Advisory Committee Report of 1933 on " Slaughtering of Livestock ", the authorities agree that, so long as slaughtering is conducted in some thousands of private slaughterhouses, proper inspection is impossible.

No case of food poisoning from fresh meat was observed, but one outbreak due to *Salmonella typhi-murium* conveyed by ducks' eggs was established.—J. C. W.

UNITED STATES OF AMERICA, WISCONSIN. (1934). **[Report of Division of] Veterinary Science. [University of Wisconsin Agricultural Experiment Station, 1932-33]**.—*Bull. Wis. agric. Exp. Sta.* No. 428. pp. 1-8.

MASTITIS IN CATTLE.—Emphasis is laid on the losses caused by this disease. An infected and a non-infected group of cows are available for the work on the subject and a grant from the Medical Milk Commission of Chicago was obtained for research on the occurrence and significance of streptococci in milk.

Such tests as that for the chlorine content, acidity, catalase, and for the causal organism by a more simple method than the blood agar plate, offer promise of being simplified so that they can be used in field work.

The so-called α streptococci are responsible for most of the cases of chronic mastitis and the β group includes some which might be harmful to human beings and cattle. An organism resembling *Streptococcus mitis*, present in the faeces of nearly all cows, did not cause infection when introduced into the udder. *Str. mitis* and *Str. salivarius* were both found to persist in the udder for months. It was shown that *Str. epidemicus* from human, bovine and equine sources can produce acute mastitis in cows. A scarlet fever organism also produced acute mastitis, but *Str. erysipelatis* failed. There was little tendency for organisms to pass from one quarter to another. The introduction of an organism into a quarter recently recovered from infection with that organism has frequently led to the development of a further attack of mastitis, indicating that no immunity had been acquired and that vaccination is, therefore, probably valueless. The milk from a chronic mastitis case is apparently not injurious to a sucking calf.

Brucella abortus INFECTION IN CATTLE.—An experiment was carried out to show that cattle, which were at one time infected but had become non-reactors, could safely mingle with susceptible animals. The susceptible animals appeared to have remained clean for the two years in which the experiment was in progress.

COCCIDIA.—A non-technical description of the life-history of *Eimeria tenella* is given. It was shown that the oocysts survive on the shells of eggs subjected to

the usual incubation and that the shells, when crushed and fed to susceptible chicks, produced coccidiosis. Oocysts remain in the epithelial lining of chickens for at least seven and a half months, possibly longer.

FUR ANIMAL DISEASE SURVEY.—The rearing of small fur-bearing animals is of considerable importance in Wisconsin. A list of the parasites found in 145 carcasses is given. Lungworms are considered to cause the most damage. The most common mistake in the feeding of foxes is the tendency to substitute cereals for meat.—F. H. MANLEY.

BOOK REVIEWS.

DUKES, H. H. [D.V.M., M.S., Professor Veterinary Physiology, New York State Veterinary College, Cornell University], HEWITT, E. A. [D.V.M., Ph.D., Associate Professor Veterinary Physiology, Division of Veterinary Medicine, Iowa State College], & MCNUTT, G. W. [D.V.M.]. (1935). **The Physiology of Domestic Animals.** pp. xiv + 643. [Numerous figs., tables and refs.] Ithaca, New York: Comstock Publishing Company, Inc. [3rd Edit.] [8vo] [$6].

This is an enlarged and revised edition of the lithoprinted book published by these authors in 1933 and reviewed in this *Bull.* **4.** 557. Whilst the arrangement of the subject matter remains much the same, many alterations have been made to the text and in parts it has been entirely re-written ; the obscure illustrations of the former edition have been deleted to the great advantage of the present work.

The authors have attempted to provide students of veterinary medicine with a text-book suitable for their courses in physiology, and it may be said at once that in this they have been highly successful. For the general reader, however, many of the sections are dealt with rather briefly, for example, the physico-chemical basis of physiological phenomena is dismissed in 15 pages and no references are given to which one may turn for further information on this important aspect of physiology. Some useful comparative tables on the composition of the blood of various domestic animals are given and the mechanism of the circulatory system is clearly described. Owing to the rapid advances in our knowledge of hormones, particularly of the sex hormones, it is impossible for the latest findings to be incorporated into a text-book of general physiology and some of the statements appearing in this edition already require modification or amplification. However, the groundwork of the subject is clearly expounded and information concerning the most recent advances in this branch of physiology must be obtained from the current journals.

It is indeed welcome to find a text-book on veterinary physiology, the illustrations of which are from experiments made on domestic animals both large and small and which are not copied from older works on human physiology. This book should find a place on the shelves of all veterinarians. The printing and reproduction of the plates and figures leave nothing to be desired, but there are a few grammatical and other errors which could be corrected with advantage in future editions of this work.—J. A. NICHOLSON.

LAFENÊTRE, H. [Dr. Vet., Directeur des Services Vétérinaires de l'Hérault], & DEDIEU, P. [Dr. Vet., Chef du Service d'Inspection des Comestibles et Directeur des Abattoirs de la Ville de Montpellier]. (1936). Technique systématique de l'inspection des viandes de boucherie. **[The Technique of Meat Inspection].** pp. viii + 408 + xxix. 167 figs., 4 tables. [Numerous refs.] Paris : Vigot Frères. [8vo] [Fr.60].

The authors in their preface state that the work is not presented as a complete treatise on meat inspection and refer readers to standard works by other authors. The book is evidently intended to aid members of the veterinary profession performing the duties of meat inspectors to carry out their work in a systematic manner and, with that object in view, the book is divided into 16 chapters dealing with :–

1. Appliances necessary.
2. The objects of meat inspection – *ante-* and *post-mortem* examinations.
3. Laboratory examinations.
4. to 9. Systematic examination of the carcasses and organs of cattle, calves, sheep, lambs, goats, kids, pigs and horses.
10. Inspection of foreign meat.
11. Inspection of frozen meat.
12. Emergency slaughtered animals, offensive odours, pigmentation, toxic and decomposing conditions. In these chapters it is urged, and very wisely so, that the laboratory should always be referred to in order to arrive at an accurate decision.
13. Fraudulent substitution with indications for the identification, for comparative purposes, of carcasses of the horse, mule, ox, calf, sheep, goat, and dog, also how to recognize sex and age in carcasses.
14. Stamping of meat passed as fit for human consumption. [A very necessary method of assuring the public that meat has been examined by a public health officer, and one which is long overdue in Great Britain].
15. Disposal of unsound foods, seizures, legal procedure and disinfection.
16. Administration, recording, reports and issuing of certificates.

This book is useful ; the plates are clear and show how to examine organs, where to incise the body lymph glands, and also the dressing and evisceration of carcasses.

We recommend the book to those interested in the subject.—T. D. Young.

Schmidt, P. [Prof. Dr Hygienisches Institut Halle], & Kairies, A. [Dr Hygienisches Institut Halle]. (1936). Neue Studien zum Problem der Influenza bei Mensch und Tier. [**Influenza in Man and Animals**]. pp. viii + 71. 1 fig. on 1 plate, 2 tables, 1 chart. [Numerous refs.] Stuttgart : Ferdinand Enke. [8vo] [RM. 6.80].

This publication, based mainly on the authors' investigations during the last nine and a half years, sets out to show that Pfeiffer's bacillus is all-important in the causation of true influenza.

The bacillus was found in about one-third of nearly 5,000 cases, with a frequency often corresponding to the wax and wane of the epidemic ; in the early stages of the disease the positive results amounted to 75 per cent. Negative findings may be accounted for on the basis of over-growth of this sensitive organism by others, in the living animal as in culture. The carrier problem is important and the need for prophylaxis in this direction mentioned. Self-inoculations of human beings with the bacillus have yielded sufficient positive results to support the authors' conception of its aetiological role, while human inoculations with filtrates of influenzal material have afforded no positive proof of the causative action of a filtrable virus ; in any case the bacillus on occasion passes bacteriological filters. The symbiotic association of streptococci with the bacillus, supplementing, as it were, its restricted metabolic activity, is emphasized. The evidence in favour of a virus aetiology of influenza is considered inadequate, though possibly other bacteria may cause influenza-like diseases in man and animals.

[Though the potential pathogenicity, in certain circumstances, of Pfeiffer's bacillus is a matter of no doubt, this monograph will not convince those conversant with the recent work of English and American observers who have produced experimental influenza with indubitably bacteria-free filtrates. These workers are misquoted in several places].—E. WESTON HURST.

CLAY, H. H. [F.R.San.I., F.I.S.E., Lecturer in Sanit. Engineering, L.S.H.; Lecturer and Examiner R. Sanit. Inst.] (1936). **The Sanitary Inspector's Handbook. A Manual for Sanitary Inspectors and Other Executive Public Health Officers.** pp. xxii + 432. 95 figs., 17 tables. London: H. K. Lewis & Co. Ltd. [2nd Edit.] [8vo] [15s.]

That a new edition of this book has become necessary proves that it is considered to be an essential in the daily work of public health officers and those studying for the sanitary inspector's certificate [see this *Bull.* **4.** 82].

The second edition has been considerably enlarged and brought up to date by adding the necessary amendments to Public Health Acts, etc. The author, who is an acknowledged authority on practical sanitation, makes no claim to be a guide on meat inspection, but he has added some useful notes on that subject in his book. As stated previously, we have nothing but praise for the book and can, with confidence, recommend all veterinary officers, more especially those performing public health work, at once to place an order for it and keep it as a reference on their tables.—T. DUNLOP YOUNG.

THOMPSON, H. [M.R.C.V.S.], & DUNCAN, A. C. [F.R.C.V.S., B.Sc. Lecturer in Veterinary Science, Royal Agricultural College, Cirencester]. (1935). **Elementary Veterinary Science.** pp. viii + 465. 35 text figs., 50 plates, 3 tables. London: Baillière, Tindall & Cox. [5th Edit.] [8vo] [10s. 6d.]

It is difficult for a veterinarian to review this book, which is intended for agriculturalists.

It contains far too many inexactitudes, both in the text and figures, to be of any value for veterinary students, yet should serve its purpose in giving a rough grounding in its subject to farmers wishing to learn a little about the structure and diseases of farm animals.

The description of the treatment of dystocia is too detailed, as lay use of complicated and dangerous parturition instruments would usually be disastrous. Similarly, the range of drugs and of treatments is too wide, as their use would depend upon accurate diagnosis, again more than a layman could be expected to find useful.—J. E.

STEPHENSON, T. [D.Sc., Ph.C., F.R.S.E., F.C.S., Editor of *The Prescriber*]. (1935). **Incompatibility in Prescriptions; and how to avoid it. With a Dictionary of Incompatibilities.** pp. vii + 62. Edinburgh: The Prescriber Offices. [4th Edit.] [8vo] [6s.]

This edition has been revised, enlarged and brought into conformity with the new editions of the British Pharmacopoeia and B.P. Codex. It is of immense value to all practitioners who dispense their own medicines and make chemical mixtures for their own use.

Incompatibility is dealt with in sections according to its nature (*e.g.*, insoluble precipitates, immiscibility, etc.) and there is an alphabetical list of drugs and their dosage, solubility and incompatibility occupying about two-thirds of the book. There is also a good index.—J. E.